NOV 21 1949

Mathematics Library

THE MATHEMATICS TEACHER

Volume XLII NOVEMBER · 1949 Number 7

CONTENTS

		Page
Mathematics and Modern Educational Trends	C. V. Newsom	339
National Council of Teachers of Mathematics, Eastern Section Meeting, New York City		344
The American Society for Engineering Education Committee on Secondary Schools	Henry H. Armsby	345
The Tenth Christmas Meeting of The National Council of Teachers of Mathematics, Wichita, Kansas		351
Have You Heard?	Edith Woolsey	356
Miscellanea—Mathematical, Historical, Pedagogical	Phillip S. Jones	357
Arithmetic, A New Section of The Mathematics Teacher	Ben A. Sueltz	359
Membership Message	Mary C. Rogers	360
Contests and Scholarships		363
Interscholastic Academic Contests in Indiana	Mary F. Anderson	364
Group Affiliation with the National Council	H. W. Charlesworth	366
Aids to Teaching	Henry W. Syer and Donovan A. Johnson	368
Special Citation to Mary A. Potter		374

OFFICIAL JOURNAL OF THE
NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS
525 WEST 120TH ST., NEW YORK 27, N.Y.

Printed at Menasha, Wisconsin

Entered as second-class matter at the post office at Menasha, Wisconsin. Acceptance for mailing at special rate of postage provided for in the Act of February 28, 1925, embodied in paragraph 4, section 412 P. L. & R., authorized March 1, 1930.

THE MATHEMATICS TEACHER

Official Journal of the National Council of Teachers of Mathematics

Devoted to the interests of mathematics in Elementary and Secondary Schools

Editor-in-Chief—WILLIAM DAVID REEVE, Teachers College, Columbia University.
Associate Editors—VERA SANFORD, State Teachers College, Oneonta, N.Y.
W. S. SCHLAUCH, Dumont, N.J.

OFFICERS OF THE NATIONAL COUNCIL OF TEACHERS MATHEMATICS

Honorary President—W. S. SCHLAUCH, Dumont, N.J.
Past President—CARL N. SHUSTER, State Teachers College, Trenton, N.J.
President—E. H. C. HILDEBRANDT, Northwestern University, Evanston, Ill.
First Vice-President—VERA SANFORD, State Teachers College, Oneonta, N.Y.
Second Vice-President—CHAS. H. BUTLER, Western State Teachers College, Kalamazoo, Mich.
Secretary-Treasurer—EDWIN W. SCHREIBER, Western Illinois State College, Macomb.
Chairman of State Representatives—KENNETH E. BROWN, University of Tenn., Knoxville, Tenn.

ADDITIONAL MEMBERS ON THE BOARD OF DIRECTORS

One Year	VERYL SCHULT, Wilson Teachers College, 11th and Harvard Sts. N.W., Washington, D.C.	1950
	ELENORE M. LAZANSKY, Berkeley, Calif.	1950
	ONA KRAFT, Collinwood High School, Cleveland, Ohio	1950
Two Years	GEORGE E. HAWKINS, Lyons Tp. High School, LaGrange, Ill.	1951
	MARIE S. WILCOX, Washington High School, Indianapolis, Ind.	1951
	JAMES H. ZANT, Oklahoma A. and M. College, Stillwater, Okla.	1951
Three Years	AGNES HERBERT, Clifton Park Junior High School, Baltimore, Md.	
	JOHN R. MAYOR, University of Wisconsin, Madison, Wis.	
	HENRY W. SYER, Boston University, Boston, Mass.	

The National Council has for its object the advancement of mathematics teaching in elementary and secondary schools. All persons interested in mathematics and mathematics teaching are eligible to membership. The membership fee is $3 per year and entitles each member to receive THE MATHEMATICS TEACHER which appears monthly except in June, July, August and September.

Correspondence relating to editorial matters, subscriptions, advertisements, and other business matters should be addressed to the office of

THE MATHEMATICS TEACHER
525 West 120th St., New York 27, N.Y. (Editorial Office)

Subscription to THE MATHEMATICS TEACHER automatically makes a subscriber a member of the National Council.

SUBSCRIPTION PRICE $3.00 PER YEAR *(eight numbers)*

Foreign postage, 50 cents per year; Canadian postage, 25 cents per year. Single copies 40 cents. Remittance should be made by Post Office Money Order, Express Order, Bank Draft, or personal check and made payable to THE MATHEMATICS TEACHER.

PRICE LIST OF REPRINTS

	4pp. 1 to 4	8pp. 5 to 8	12pp. 9 to 12	16pp. 13 to 16	20pp. 17 to 20	24pp. 21 to 24	28pp. 25 to 28	32pp. 29 to 32	Covers
25 or less	$4.40	$6.05	$6.60	$ 8.25	$ 9.90	$12.10	$13.20	$13.75	$5.50
50 copies	4.68	6.60	7.48	9.24	11.11	13.42	14.74	15.40	6.03
75 copies	4.95	7.15	8.36	10.23	12.32	14.74	16.28	17.02	6.68
100 copies	5.23	7.70	9.24	11.22	13.53	16.06	17.82	18.70	7.15
Additional copies per C.	1.10	2.20	3.52	3.96	4.84	5.28	6.16	6.60	2.20

For 500 copies deduct 5%; for 1,000 copies or more deduct 10%.
NOTE: For any reprints requiring additional composition or changes in text or cover, an extra charge will be made.

Please mention the MATHEMATICS TEACHER when answering advertisements

THE MATHEMATICS TEACHER

Volume XLII Number 7

Edited by William David Reeve

Mathematics and Modern Educational Trends*

By C. V. Newsom

Assistant Commissioner for Higher Education, The University of The State of New York, The State Education Department, Albany 1, N. Y.

As a young high school student of physics, I was impressed by the study of vector diagrams. I have distinct recollections of drawing a considerable assortment of diagrams in which many vectors would be operating upon a point. After that I would play a game of solitaire in which I would speculate upon the nature of the resultant vector; then I would either confirm or deny my speculation by completing many parallelograms or by adding the horizontal and then the vertical components of the several vectors. This love of vector problems is still with me.

Tonight I should like to think of mathematics, or any other traditional subject in our curriculum, as a point; this point is being subjected to many vectors representing the various pressures and trends in modern educational society. In what direction will the point be displaced? What attitude should we as educators adopt in regard to the vectors in our diagram? Perhaps, in spite of the great strength of some of the forces, their magnitude and direction is such that we shall achieve an effect of cancellation; that would indeed be unfortunate. A progressive society requires progress in education; we cannot adopt a static point of view merely because of the difficulties inherent in our pressure diagram.

Let us stop and examine some of the forces to which a subject such as mathematics is being subjected. First, we must recognize the existence of a very strong practical school of thought. Many parents argue that they want their children to be prepared for the realities of life; they want, as they describe it, a practical education. A few weeks ago I rode on the train with a businessman, who, not knowing that I am an educator, told me in forceful language how his children had wasted their time by taking a good-for-nothing program in high school and in college. He insisted that an education should be fundamentally concerned with "earning a living"; in fact, he conceived of no other purpose. Why has Latin been pushed out of the curriculum? Because, a vocal majority said "Impractical." Why is the study of literature under fire in some quarters? Because, some assert that "a knowledge of good literature does not assist one to earn dollars." Why are algebra and geometry being criticized? The major complaint is, as I have heard it stated so frequently, "That stuff is good only for the few; my boy is going to become a businessman,

* Read at the Annual Meeting of The National Council of Teachers of Mathematics at Baltimore, Md. on April 1 and 2, 1949—Editor.

and he will have no need for algebra or geometry." The vector representing the force of the so-called practical point of view is a long one, and all of us in the field of education have learned that we cannot ignore it. Of course, frankly, the argument of the practical man has merit; education should train the young man or woman to earn dollars and to face the realities of life. Mathematics is one of the most practical of subjects, and I regard it as unfortunate when a student finishes any course in mathematics without an enlarged capacity to utilize it in real situations that are encountered.

The second vector is that supplied by those who emphasize the importance of the cultural values that each generation must pass on to the succeeding generation. The force represented by this pressure is regarded by some as being somewhat in opposition to that described by the first vector. Frequently the exponents of the educational philosophy of cultural transfer are bitter and uncompromising in arguing with those who characterize themselves as practical. Some colleges and preparatory schools advertise that they remain strongholds of the old traditions; a president of such an institution stated recently, "My college prefers to offer our students a real education." A visitor from abroad was in my office a few months ago, and he expressed the firm conviction that American education had been cheapened during the past few decades. He said that by contrast with England, with France, with Italy, and with Argentina, American students are an ignorant lot, and have no appreciation of the "finer things of life." Many foreign educators have made this same criticism. We would all admit that "Man does not live by bread alone," and an education must provide our students with an appreciation of those great cultural values that have given man his stature. Thus, we must listen to the exponents of culture, and the vector representing their pleas must be a comparatively long one. The mathematician has a special obligation in this regard, for the imprint of mathematics is to be found on many of the significant cultural trends of history, especially in philosophy. Frequently today we hear that man's outlook on life has been changed by a few simple equations that have enabled him to release atomic energy; I remind you that many revolutions have occurred in the history of man as a result of a few simple equations.

Inserted in our diagram somewhere between the two vectors already discussed is one representing the pressure introduced by the movement for general education. Many very thoughtful educators insist that irrespective of one's later specialization there is an elastic core of fundamental knowledge that all persons need, especially in a democracy. Such a philosophy has been responsible in part for mass education. In general, advocates of general education recognize the place of science, that of the humanities, and that of the social sciences in the basic framework of human knowledge; they recognize both the realities and the luxuries of life; sometimes, perhaps, they have not been too much concerned with the selection and training of specialists who must break the new frontiers of man's experience. The general education movement is a strong one, and will become stronger; the point representing mathematics in our diagram is being subjected to a vector of considerable magnitude as a result of this pressure. Moreover, no honest educator will deny that the movement toward more general education has merit, and deserves our attention. Certainly the mathematician cannot ignore this trend, for his own subject is close to the core of all knowledge; I wonder sometimes, however, if many teachers of mathematics do not emphasize the trivial and ignore the fundamental.

Mathematics and science must recognize the existence of a fourth vector that denotes the pressure resulting from an imperative need for more and better scientists. I was most impressed with a conversation I had a few weeks ago with a

distinguished scientist. In spite of the atomic bomb and other scientific marvels, this scientific leader painted a dreary picture of science in this country. He asserted that his laboratories could employ many technicians, but that it was almost impossible to find well-trained scientists. He stated his conviction that those theoretical scientists in this country who could expand available physical theory numbered only a few hundred, and that there is impending in science a crisis much more serious than the shortage of steel or petroleum. We all know how dependent we have been on the European countries for the production of experts in theory. Many of our scientists insist that competent theoretical men must be detected early in their youth, and that the able young man must not be forced to stay in "a chain-gang of mediocrity," as one mathematician describes the present situation.

It is foolish to deny that many of our most learned scientists are alarmed at various trends in education, especially in mass education and in programs of general education, for they feel that a great crack is developing in the armor of our scientific strength. Moreover, it is my personal belief that we as mathematicians have added cause for concern in view of the fact that many of the frontiers of knowledge in the fields of human behavior are now regarded as definitely mathematical. The work of Wiener, Rashevsky, von Neumann and others represents a frontal attack on problems previously regarded as quite impossible. Some of this work is related to the development of automatic computing machinery, and I wonder how many of us realize the truly momentous nature of modern developments. Certainly they will be rated beside atomic energy when the history of this decade is written. We want to train students who will be in a position to continue such fundamental investigations; that is part of our obligation to society. As a result of such considerations, there is a strong renewal of the argument that it is essential to have a lot in education that is wasted upon the majority of students, but it must be there in order that we will not miss a potential Newton or Einstein. Every educator will admit that America must remain strong, and that we all profit from the greater comfort, safety, and convenience that increased scientific knowledge will bring to us. Moreover, we all recognize that any optimism for the future of society requires the training of leaders. We cannot afford to ignore this long vector that demands more attention to our youth of ability; I direct this statement especially to educational administrators, but teachers must accept their share of the responsibility.

In the fifth place, we observe the pressure of those who ask for more individualized instruction for all students. We hear frequently the plea that the student should be at the center of our program in education, not the curriculum. Because of environment and heredity there are individual differences, a tremendous variety of differences in fact, that must be recognized in any educational effort, and the traditional curriculum needs continual modification. This vector, in common with all the other vectors, contains many of the same elements already discussed, but I recognize it as a separate force in our modern educational universe. The merit of this vector is undebatable.

Other vectors might be named and described, but it seems sufficient for our purpose to stop with the five. You will note that I have recognized the validity of all of them even though they may appear to lead to contradictions. Every one of the five is of genuine concern to each teacher of mathematics, or of English, or of any subject.

Unfortunately, I observe no genuine educational leadership that is analyzing our vector diagram as a whole. One person professes to be an expert in elementary education, but admits that he knows nothing of the problems or trends in secondary and higher education. The man in higher education has limited opportunities to ex-

change ideas with those who are concerned with the problems of secondary education. One leader becomes known for his association with the movement in general education, and becomes a student, perhaps, of only his one vector. Another person becomes a crusader in behalf of a stronger program for the potential genius and cares little about the schooling of the masses. Sometimes I believe that this country needs more educators and fewer experts; we need men who are willing to give thoughtful consideration to all the movements to be found in the field of education.

In recent years most of those who would improve our educational program have given their major attention to the curriculum. Every day I receive reports on new curricular studies. I recognize the importance of such studies. Nevertheless, I strongly suspect that the pendulum has swung too strongly in the direction of the development of devices without a complementary emphasis on those who are to administer the devices. Give me a good teacher and I become unconcerned about the syllabus that he follows or the textbooks that he adopts. Of course, without uniformly competent instructors the only protection for our youth is the development of guidance materials for the teacher.

I have noticed for years that there is no particular problem in regard to the instructional program in mathematics in those localities where there are good teachers. There are high schools where students generally want to study three or four years of mathematics without any considerable compulsion. I visited such a community about three years ago, and I had an opportunity to inquire about the success of one teacher. A businessman told me with glowing satisfaction of the intensely practical slant of this particular teacher. He described the enthusiasm of his own son who was able to apply his mathematical knowledge to the study of radio. Another parent reported upon the teacher's breadth of knowledge, and spoke enthusiastically of the teacher's success in relating mathematics to music, to history, and to religion. A member of the school board took obvious pride in asserting that the graduates of the school made outstanding records in college mathematics, and several went on to obtain doctor's degrees in the field of mathematics. He further testified to the teacher's ability to make mathematical theory seem very simple. Another man spoke of the fact that his son had not understood mathematics since the early grades, but the teacher in question succeeded in detecting the cause of his son's difficulties. In other words, here was a teacher with the remarkable ability of being able to satisfy the needs of virtually all of his students; he was satisfying simultaneously all the forces involved in our vector diagram. It is difficult, I admit, but it can be done. A year ago I recommended this teacher to one of the largest high schools in the country, and he was offered a very fine salary. However, much to my amazement, I discovered that he was already making about $1,500 a year more in the town of 10,000 where he was teaching. The people of that community realized that they possessed a valuable asset, so everything possible was being done to make the teacher contented and happy. A good teacher is a jewel much to be desired; there are not very many of them; and it is urgent that school systems review their policies so that good teachers can receive genuine satisfaction from their endeavors.

Mathematicians, along with those in other subject matter fields, must start a campaign of recruitment for teachers among those young people who seem to possess the personality and aptitudes that are required for this most difficult of professions. As I conceive the training program of the future, a potential teacher would serve a teaching internship of four to six years along with his academic preparation. So, instead of much of the traditional program in education, the young teacher would become a partici-

pant in an informal way in the activities of the classroom at a comparatively early age. The experiences of the classroom would become the basis for further studies in the learning process, individual differences, the needs of students, and so on. During this training period the future teacher might even spend one or more summers participating in the mathematical activities of selected industries; such industrial experience might be synthesized in an institute somewhat similar to those sponsored by Professor Rankin at Duke University and now being extended to other areas.

The course work in mathematics for our potential teacher would study the interrelationship of mathematics and philosophy, the influence of mathematics on the development of civilization, and the possibilities and limitations of the mathematical method. Certainly some of the great events in mathematical history would be examined at the appropriate time in a student's development, and the significance of these events would be considered. The curriculum in mathematics itself would achieve greater thoroughness by more emphasis on fundamental concepts and by the elimination of much detail. At last, we are making some headway in this direction. Unfortunately, there is too much lag in our curriculum between that which is taught and that known to be significant. I have never understood why among educated men it is so difficult to change the content of a course in our curriculum. Yet, I know from experience that teachers will fight to the bitter end to maintain the organization of a course without change even though the most convincing arguments are presented for the elimination of some material and the addition of other topics. There should be more seminars in our teacher-training programs for the purpose of integrating subject matter, and for the purpose of discussing the utilization of mathematics in other fields of knowledge.

As a part of the proposed internship, the future teacher could serve as an advisor to young students having serious problems of adjustment, and part of his advisory relationship would require seeking help from the fields of psychology and sociology. The young teacher might be issued auditors' permits so that he could sample the subject matter and methods of presentation of several master teachers. He should participate in seminars and other studies on broad areas of culture and problems of human society. Certainly the young teacher would have opportunities to study and criticize the latest devices in audio and visual education. We in mathematics have been especially slow in recognizing the importance of such methods.

I know that much of my proposal sounds idealistic, and may be regarded as heresy in some quarters. Simply stated, however, I am asking that we place first emphasis on the selection and training of teachers. I am asking for teachers of mathematics who know their subject and who also comprehend its uses and significance. Moreover, our teachers must have greater breadth of understanding than that which is required of any other profession. They must have a knowledge of students that can only be gained from studied experience with students, and they must be prepared to detect hidden capacities and deficiencies in those students who are under their tutelage. The teacher who then achieves success should receive the finest recognition that our society has to offer.

In summary, let me emphasize again that the solution of our problems can come only through co-operation, not division. The problems of the mathematics teacher are not essentially different from those of the English teacher, the history teacher, or the language teacher. We are going through a period of inquiry and experimentation that has led to the development of many schools of thought in the field of education. It is not a question of who will win, for all must win. Under any circumstances, let's minimize any solution

based on mechanical schemes; we must put the emphasis where it belongs, namely, upon the training of better teachers and upon greater recognition for the successful teacher. It follows that the immediate focal point in our demand for a re-evaluation of our educational program is in our colleges and universities where teachers are being trained. Since I am in the field of higher education, perhaps I exaggerate the responsibility that we must accept. I think not, however. The challenge to us is great, and the assistance of such groups as the National Council is essential in order that we may see clearly the nature of our problem and its possible solutions.

NCTM Eastern Section Meeting—New York City

TUESDAY, DECEMBER 27

2:00 P.M.: Grand Ball Room, Hotel New Yorker; Joint Session with National Science Teachers Association. "Variability Related to Science Learning," Dr. Barnett Rich.

THURSDAY, DECEMBER 29

Teachers College, Columbia University

10:15 A.M.: "Contribution of Mathematics to General Education."

Panel 1, Arithmetic. Dr. H. Van Engen, Chairman. Room 211 Teachers College.

Panel 2, Junior High School Mathematics. Miss Margaret Dunn, Chairman. Room 200 Teachers College.

Panel 3, Tenth Year Mathematics. Mr. Julius Hlavaty, Chairman. Room 300 Teachers College.

12:30 P.M.: Luncheon. John Jay Hall, Columbia University. $1.50.*

2:30 P.M.: "Necessary Special Instruction in Mathematics."

Panel 4, Arithmetic. Dr. Foster Grossnickle, Chairman. Room 211 Teachers College.

Panel 5, Junior High School Mathematics. Mrs. Lorraine Addelston, Chairman. Room 200 Teachers College.

Panel 6, Senior High School Mathematics. Mr. Paul Clifford, Chairman. Room 300 Teachers College.

4:30 P.M.: Reception, Second Floor Lounge, Men's Faculty Club, Columbia University.

6:30 P.M.: Dinner, Men's Faculty Club, Columbia University. $2.50.* Speaker William R. Pabst, Ordnance Department, U. S. Navy. Topic: "Statistics for the Millions."

* Please make luncheon and dinner reservations by December 22. Make checks payable to Dr. Irving A. Dodes, and send to Dr. Dodes at 100–10 67 Road, Forest Hills, L. I., N. Y.

*Dr. Irving A. Dodes, Chairman
Luncheon and Dinner Committee
100–10 67 Road
Forest Hills, Long Island, N. Y.

Please reserve _____ plate(s) for me for luncheon, at $1.50 per plate.

Please reserve _____ plate(s) for me for dinner, at $2.50 per plate.

Enclosed is check for $_____.

NAME _____
(please print)

ADDRESS _____

*Please send reservations in by December 22. Make checks payable to Dr. Irving A. Dodes.

The American Society for Engineering Education Committee on Secondary Schools[1]

By HENRY H. ARMSBY

Specialist in Engineering Education, U. S. Office of Education

IT SHOULD be unnecessary to say before a group of mathematics teachers that engineering educators are concerned with the kind of education our secondary schools are giving. Dean Steinberg has ably presented[2] the importance of sound training in mathematics as a foundation for engineering education. I endorse his statement, but wish to add that the engineering schools are also vitally interested in the entire educational program of secondary school students, and in the quality of work they do, not only in their mathematics, but in all their subjects. Most of the progressive engineering colleges have for years attempted to improve and strengthen their relations with the secondary schools from which they draw students, chiefly by sincere efforts to furnish intelligent, authoritative, and objective guidance to secondary school students.

During my service as staff member at the Missouri School of Mines and Metallurgy, I spent a large amount of time visiting secondary schools and junior colleges throughout the State to give guidance service to their students. During all these years I never once tried to urge any student to attend the School of Mines. In fact I frequently told the boys that our faculty was just as much interested in getting some of them to stay away from our school as in getting some of them to come to it.

One section of these guidance talks outlined the characteristics which I felt a boy should have in order to have a reasonable chance of success in engineering. Among these characteristics mathematical ability was always stressed. Like all engineering schools, we required a certain minimum preparation in mathematics and science, which we considered absolutely essential as a foundation for the study of engineering. However, a study I made during those years of the grades of all students then in the institution compared with their record in secondary school mathematics showed that the boys with only two units of mathematics, but with a rank in the top quarter of their secondary school class, did considerably better work than the boys whose general average placed them in the lower quarter of their class, but who had as many as three or four, and in a few cases five, units of mathematics.

So I told the students that they didn't need to be mathematical geniuses, and that in the final analysis we were more interested in *how* they had studied in secondary school than in *what* they had studied. But I also said they needed *at least* our minimum entrance requirements in mathematics and science, with a good facility in their use, and that above all they needed a mathematical frame of mind and a *liking* for mathematics—for figuring things out—for doing things thoroughly and accurately—for trying to find out not merely *how* things work, but *why*.

Concrete evidence of the appreciation by engineering educators of the importance of the problems inherent in the relationships between engineering colleges and secondary schools was given in 1942 when a Committee on Secondary Schools was appointed by the Society for the Promotion of Engineering Education

[1] Read at the twenty-seventh annual meeting of The National Council of Teachers of Mathematics at Baltimore, Maryland, April 1 and 2, 1949.

[2] See the previous paper in this issue.—Editor.

(now the American Society for Engineering Education).

This Society has been in existence for 55 years as the *one* national society in the United States devoted primarily to the interests of engineering education and research. There are many professional engineering societies in the United States, each devoted to the professional development of its members as practicing engineers. These societies, and all employers of engineers, are of course interested in the kind of engineering education offered in the colleges. But their primary interest is with the practice of engineering, and educational implications are incidental. Conversely, ASEE is interested in the activities of practicing engineers. Engineering teachers must keep abreast of technical and engineering developments in order to keep their educational offerings keyed to the needs of the country. But ASEE looks first at the *educational* implications of new things—to the effect which new developments will have on educational processes and programs.

ASEE cuts across all divisions of engineering. It unites the electrical, the civil, the mechanical, the chemical, the mining engineer, into the one big over-all field of engineering education. It tends to emphasize the unity of the profession, rather than its diversity. It is devoted to the advancement of education and research in all branches of engineering, as well as in allied branches of science and technology.

ASEE has had a steady growth in membership and in activity, from a mere handful of men in 1893 to 168 institutional and nearly 6000 individual members in 1949, drawn from every State and Territory, and from many foreign countries, and representing every major field of engineering. Individual membership is open to "Individuals who are or who have been actively engaged in engineering education, as well as practicing engineers, industrial executives, and others interested in engineering education." This clearly includes secondary school teachers and administrators, as well as industrialists, many of whom are active in the work of the Society. Naturally, the majority of the members are educators and educational administrators in the fields of engineering and science, and among them are found nearly all of the men who are considered by their colleagues to be the leaders of the profession.

The Society has grown in complexity and in diversity of interest as it has grown in membershlp. It is now composed of nineteen divisions and a number of committees which represent various professional branches of science, engineering, and related fields. The divisions include a Division of Mathematics, a Division of Physics, a Division of Educational Methods, a Division of Humanistic-Social Studies, and divisions in all the major fields of engineering. The committees include one on Junior Colleges, one on selection and Guidance, and the Committee on Secondary Schools. The divisions and committees arrange technical programs for the annual meetings and are responsible for much of the technical work of the Society. A number of studies of far reaching importance to engineering colleges and the educational profession have been conducted through division and committee activities. I should like to mention specifically two recent Committee reports which rank among the important educational documents of recent years. These are, the report on "Aims and Scope of Engineering Curricula" issued in 1940, and the report on "Engineering Education after the War" issued in 1944. Preceding these was the self-survey of engineering education conducted by the Wickenden Committee and resulting in the two-volume report issued in 1930 and 1934, which still ranks as one of the outstanding educational surveys of the century.

There are sixteen geographical sections of the Society, and local branches of the Society in a large number of engineering

colleges give students an opportunity to participate in the activities of the Society.

The Society publishes monthly during the academic year the *Journal of Engineering Education*, which is a veritable mine of vital and helpful information on all phases of engineering education, educational administration, and research.

SPEE in 1932 cooperated with the so-called Founder Societies, the national societies representing the professions of civil, electrical, mechanical, mining, metallurgical, and chemical engineering, the National Council of State Boards of Engineering Examiners, and the Engineering Institute of Canada, in forming the Engineers' Council for Professional Development. This organization has played a highly important role in developing professional consciousness among all engineers, and has rendered a most significant service to engineering education, especially through the activities of its Committee on Student Selection and Guidance, its Measurement and Guidance Project, and its program of accrediting engineering curricula. This program has been in operation ever since the establishment of ECPD, and in the last two years the Council has inaugurated a similar program for the accreditation of technical institutes which bids fair to be equally valuable in that field.

In 1945 the Society adopted a new constitution and its new name. At that time the former Division of Deans and Administrative Officers became the present Engineering College Administrative Council, which is directly in charge of the interests of institutional members, of the development of studies of administrative procedures, and in general of all matters pertaining to the administration of engineering education as contrasted with the actual teaching program. At the same time the organization formerly known as the Engineering College Research Association was incorporated into the Society as the Engineering College Research Council of ASEE. This group assists in developing research facilities in engineering colleges and aids in the promotion and coordination of scientific and industrial research, for example by cooperating with governmental agencies and industrial organizations in the formulation of research programs. Through these activities the Council contributes to the improvement of advanced study in engineering colleges.

The Committee on Secondary Schools of ASEE was originally appointed late in the spring of 1942, and consisted of five members, of whom your speaker is the only one still holding membership on the Committee. The Chairman was Delos M. Palmer, at that time Dean of Engineering at the University of Toledo. The first regular meeting of the Committee was held during the national SPEE meeting in June 1943. Prior to the meeting the Chairman had asked all the members of the Committee to suggest topics for discussion. Four members submitted a total of 22 topics, of which five dealt directly with mathematics, and eleven with the general subject of guidance for students in secondary schools as to the aims, objectives, and necessary preparation for engineering education. The minutes of the meeting indicate that the subject of guidance was the main topic of discussion, and the Committee recommended to the Society that a study be made of guidance procedures and measures for cooperation with secondary schools then in use in the engineering colleges. Because of the war situation, however, it was deemed inadvisable to send to the colleges the questionnaire proposed by the Committee, and to the best of my knowledge there still is no systematic collection of information on this important matter.

Dean Palmer resigned as chairman of the Committee in December 1943, due to his leaving educational work for industry. Your speaker was appointed chairman to succeed him, and continued in that capacity until after the meeting of the Society in 1947, at which time the Committee was reorganized as will be outlined

later. At the meeting of SPEE in 1944, the Committee held two closed sessions at which it discussed in considerable detail a summary of a report by a Special Committee of the U. S. Office of Education on the Improvement of Teaching of Science and Mathematics in High Schools, submitted by Professor Lark-Horowitz of Purdue University, a member of the Special Committee. The Committee submitted a report to the National Council of SPEE, recommending that the Society should:

1. Encourage an expansion of the offerings by secondary schools in mathematics, physics, and chemistry;
2. Encourage programs for the training of teachers in these subjects; and
3. Support means and ways by which secondary schools may more successfully compete with industrial employment in attracting and holding competent teachers of science and mathematics.

Discussions within the Committee as to desirable relationships between the Society and secondary schools led to the following recommendations:

1. That the Society encourage membership in the Society for the Promotion of Engineering Education of secondary school teachers and officials interested in engineering education.
2. That engineering colleges make every effort to give secondary school authorities and students pertinent information concernng their respective institutions and the profession of engineering.
3. That the Committee on Sections and Branches be asked to encourage joint meetings with secondary school superintendents, principals, advisors, and teachers.
4. That every engineering college be urged to report to the secondary schools the progress of their graduates in the college of engineering.
5. That if the Society is to continue to have a Committee on Secondary Schools, such committee should contain representatives of secondary schools.

Both sets of recommendations were approved by Council, and in accordance with the last one Dr. Philip G. Johnson, Specialist for Science, Division of Secondary Education, U. S. Office of Education, was added to the Committee, on which he still serves.

Due to war restrictions, no meeting of the Society was held in 1945. At the 1946 meeting, the Committee held its first open meeting, to which were invited any interested persons in attendance at the Convention. Four papers were presented, dealing with preparation for engineering, entrance examinations, and the teaching of science in secondary schools. Sixteen members of the Society attended this meeting, and the discussion following the papers showed an active interest in the program of the Committee, and resulted in a recommendation to the National Council that SPEE take out an institutional membership in the National Science Teachers Association. This recommendation was approved by Council.

At the 1947 meeting the Committee held two open meetings, a joint luncheon meeting with the Division of Physics, and one executive session. Among the papers presented, before small but actively interested audiences, were one by Professor Zant, our chairman today, on the subject, "The Engineering Staff's Responsibilities and Opportunities in the Improvement of Learning and Teaching of Mathematics in the Secondary School," and one by Professor Harold P. Fawcett of Ohio State University of "Mathematics for General Education and for the Engineer." Other papers dealt with science teaching and counseling in secondary schools, the Engineering Aptitude Test for High School Sophomores then under development by the Measurement and Guidance Project, and the General Electric Company fellow-

ships for secondary school science teachers.

The Committee devoted the Executive Session to a discussion of future activities of the Committee. The members had been greatly disappointed at the small attendance which had marked meetings of the Committee, and sought to find ways and means for increasing participation in the affairs of the Committee by the members of the Society. It was the unanimous opinion of the Committee that the reason for the poor attendance lay not in a lack of interest on the part of Society members, but in the fact that the interests of this Committee cut across all the divisional lines and its meetings had to compete with those of the subject matter divisions and with the meetings of the Deans. The Committee believed that the relationships between engineering colleges and secondary schools are of such vital importance to engineering education that they should be the direct concern of those charged with the responsibility for the administration of engineering education, namely the Deans of Engineering. They further believed that the Committee should really represent the Deans and the departments most directly concerned with entering students, rather than simply representing the Society as a whole.

The Committee therefore made the following recommendations to the National Council:

1. That the present Committee on Secondary Schools be discharged.
2. That a new committee be formed representative of and responsible to the Engineering College Administrative Council and including *representatives selected by subject matter divisions of the Society*. (Informally it was recommended that the Chairman of the new committee be a Dean of Engineering).
3. We recommend that this new committee always include representatives of the divisions of physics, chemistry, *and mathematics*, and about five other divisions of the society and at least two representatives of secondary education.
4. Your committee recommends that continuity of the new committee be assured by staggered three year appointments.

The report was approved by Council on November 11, 1947, and on February 11, 1948, Dean S. S. Steinberg of the Univerysity of Maryland, the President of the Engineering College Administrative Council, appointed a new Committee of ten members, under the chairmanship of Dean L. M. K. Boelter of the University of California at Los Angeles. The members represent secondary education (2 members), technical institutes, the U. S. Office of Education (2 members), and the Divisions of Civil Engineering, Physics, English, Chemistry, and Mathematics.

The 1948 meeting of the Committee was announced in the Society's program as a meeting sponsored by the Engineering College Administrative Council, and attracted a much larger audience than had attended any previous meetings of the Committee. The meeting took the form of a round table discussion on the general topic "Relations Between Engineering Schools and Secondary Schools." Your speaker served as the moderator for the meeting, and the participants were: Mr. H. H. Spindt, Director of Admission, University of California; Professor W. S. Evans, Head of the Department of Civil Engineering, University of Maine; Professor G. B. Baker, Principal of the Austin, Texas, High School; Mr. E. C. Koerper of the A. O. Smith Corporation, Milwaukee, Wisconsin; and Professor Addison Lee, of the University of Texas.

The presentations by the members of the panel were followed by a lively discussion from the floor, and it was the consensus that the meeting had been well worth while, and that the reorganization of the Committee had been a decided step forward.

Last fall Dean Steinberg relieved Dean Boelter of his responsibility as Chairman

of the Committee, and appointed Assistant Dean E. D. Howe of the University of California at Berkeley to succeed him. At the time this paper is being prepared, Dean Howe is organizing a Committee program for the ASEE meeting to be held in Troy next June. I have reported your meeting here today to Dean Howe, and have suggested that a brief report of it be included in the meeting of the ASEE Committee on Secondary Schools.

This brief résumé of the activities of the ASEE Committee on Secondary Schools should make it clear that the Committee has two principal reasons for its existence. It wishes to improve and strengthen the already cordial relations existing between secondary schools and engineering colleges, and it wishes to assist the secondary schools in providing secondary school students with accurate and objective information as to the requirements for success in engineering, and the opportunities available in this field. We recognize the problems facing the secondary schools which arise from the facts that only a small percentage of their graduates go to college, and that of this small percentage only about one in ten on the average registers for engineering. These facts pose many problems for secondary school teachers and administrators, problems in the solution of which engineering college administrators and teachers should be able to help. Similarly, secondary school teachers and administrators, particularly teachers of mathematics, are in a position to give much helpful advice to the engineering colleges. It is the hope of the ASEE that through its Committee on Secondary Schools a two-way flow of information and advice may be stimulated so that both the secondary schools and the engineering colleges may increase the value of their services to our Nation.

Corrections on the List of State Representatives

SEVERAL errors were made in the list of State Representatives which appeared in the October issue. The following are correctly listed.

Mr. R. A. Baumgartner
Freeport High School
Freeport, Illinois

Mr. J. A. Banks
George Peabody College for Teachers
Nashville, Tennessee

Professor Palmer O. Steen
University of Wyoming
Laramie, Wyoming

Miss Annie John Williams
Julian S. Carr Junior High School
Durham, North Carolina

Mr. John O. Smith
1614 Fayetteville Street
Durham, North Carolina

The Tenth Christmas Meeting
The National Council of Teachers of Mathematics

WICHITA, KANSAS

DECEMBER 28, 29 AND 30, 1949

WEDNESDAY, DECEMBER 28, 1949

12:00 NOON to 5:00 P.M. Registration—Wichita High School East, 2301 East Douglas Avenue

1:00 to 5:00 P.M. Tour of Wichita and Wichita Industries (Guests of Wichita Mathematics Association)

THURSDAY, DECEMBER 29, 1949

8:00 A.M. to 6:00 P.M. Registration—Wichita High School East

8:30 to 9:30 A.M. Mathematics Films—Room 320, East High School

9:30 A.M. to NOON. Elementary Section—Auditorium, Roosevelt Intermediate School, 2201 East Douglas Avenue

Presiding: Edith Woolsey, Sanford Junior High School, Minneapolis, Minnesota

General Address: Building Number Concepts
F. Lynwood Wren, George Peabody College for Teachers, Nashville, Tennessee

General Discussion: Led by Miss Helen Pelzel, Principal, Fairmount School, Wichita, Kansas

9:30 to 10:30 A.M. Secondary Section—Auditorium, East High School

Presiding: H. W. Charlesworth, East High School, Denver, Colorado

General Address: Contributions Made to Effective Teaching by Inclusion of the History of Mathematics in the Regular Courses
J. O. Hassler, University of Oklahoma, Norman, Oklahoma

10:45 A.M. to 12:00 NOON. Secondary Section—Room 205, East High School

Presiding: Walter H. Carnahan, Purdue University, Lafayette, Indiana

The Low-Average Pupil Grows through Plane Geometry
Mary Winters Smith, Sewickley High School, Sewickley, Pennsylvania

Is Mathematics too Self-Satisfied?
Henry W. Syer, School of Education, Boston University, Boston, Massachusetts

10:45 A.M. to 12:00 NOON. Teacher Training Section—Room 204, East High School

Presiding: James H. Zant, Oklahoma A. and M. College, Stillwater, Oklahoma

Core Themes in Mathematical Instruction
Aaron Bakst, New York University, New York, New York

12:15 P.M. Get-Acquainted Luncheon.—Cafeteria, East High School

Make reservations in advance. Send $1.25 to Miss Winona McFall, Wichita High School East, Wichita, Kansas. See reservation form at end of program.

2:00 to 4:00 P.M. Elementary Section—Auditorium, Roosevelt Intermediate School

Presiding: Miss Delore Gammon, Director of Elementary Education, Wichita Public Schools

Aids to Better Teaching: Arithmetic Curriculum in the Tulsa and Wichita Public Schools

Leaders:
Mabel Miles, Tulsa, Kindergarten, Preprimary, Grades 1 and 2
Neva Lovell, Wichita, Kindergarten, Grades 1 and 2
Esther Ball, Wichita, Grades 3 and 4
Rachael Van Horn, Tulsa, Grades 3 and 4
Roxa Porter, Wichita, Grades 5 and 6
Bona Gordey, Tulsa, Grades 5 and 6

2:00 to 5:00 P.M. Mathematics Films—Room 320 East High School

2:00 TO 4:00 P.M. Secondary Section—Room 205, East High School

Presiding: Henry W. Syer, School of Education, Boston University, Boston Massachusetts

The Teaching of Functional Relations
Clyde T. McCormick, Illinois State Normal University, Normal, Illinois

Measurement in Secondary Mathematics
Nettie-Alice Doolittle, University of Missouri, Columbia, Missouri

Some Observations on High School Mathematics as Related to the Mathematics in Colleges of Engineering
W. I. Layton, Dean of Instruction, State Teachers College, Frostburg, Maryland

2:00 to 4:00 P.M. College Section—Room 204, East High School

Presiding: J. O. Hassler, University of Oklahoma, Norman, Oklahoma

What is Being Done and Can be Done to Give Graduate Students Training for Teaching Mathematics at the College Level?
Walter Shirley, Oklahoma City University, Oklahoma City, Oklahoma

The Use of Entrance Tests Scores in Classifying College Students in Mathematics Courses
George M. Ewing, University of Missouri, Columbia, Missouri

6:30 P.M. Banquet—Lassen Hotel, 155 North Market

Address by Professor Charles A. Hutchinson, Department of Applied Mathematics in

the College of Engineering, University of Colorado, Boulder, Colorado
(Note: Reservations at $2.75 in advance. See reservation form at end of program)

FRIDAY, DECEMBER 30, 1949

8:00 A.M. to 3:00 P.M. Registration—Wichita High School East

8:30 to 9:30 A.M. Mathematics Films—Room 320, East High School

9:30 to 10:30 A.M. General Session—Auditorium, East High School
Presiding: Gilbert Ulmer, Editor, Kansas Mathematics Bulletin, University of Kansas, Lawrence, Kansas

General Address: Mathematics in Human Experience
Walter H. Carnahan, Purdue University, Lafayette, Indiana

10:45 to 12:15 P.M. Discussion Groups and Clinics—East High School

GROUP 1—Room 206
Topic: Can Pupil Failures in Plane Geometry be Reduced by Use of the Laboratory Method?
Leader: Allene Archer, Thomas Jefferson High School, Richmond, Virginia

GROUP 2—Room 207
Topic: What Can We Do with the Low-Level Group in the Ninth-Year Course?
Leader: Rosalie Dunham, Tulsa University, Tulsa, Oklahoma

GROUP 3—Room 208
Topic: What Mathematics? To Whom? And How? (Grades 7 to 9)
Leader: Agnes Herbert, Clifton Park Junior High School, Baltimore, Maryland

GROUP 4—Room 209
Topic: The Future of High School Mathematics Contests
Leader: Adrien L. Hess, Montana State College, Bozeman, Montana

GROUP 5—Room 106
Topic: What are the Basic Assumptions of Mathematics and How Can We Teach Them?
Leader: Ruth Lane, Sam Houston State Teachers College, Huntsville, Texas

GROUP 6—Room 107
Topic: How Effective is the Education of Our Mathematics Teachers?
Leader: Eunice Lewis, University High School, University of Oklahoma, Norman, Oklahoma

GROUP 7—Room 108
Topic: How Can the Classroom Teacher Evaluate Thinking in Arithmetic? (Grades 6–8)
Leader: Ann C. Peters, Keene Teachers College, Keene, New Hampshire

GROUP 8—Room 109
Topic: Teaching Devices that Help Show Students How Interesting Algebra and Geometry Are
Leader: Henry Swain, New Trier Township High School, Winnetka, Illinois

GROUP 9—Room 110
Topic: Can Algebra be so Organized that it Can be Taught in a Manner Similar to the Nature of Proof Courses?
Leader: Oscar F. Schaaf, College of Education, Ohio State University, Columbus, Ohio

GROUP 10—Room 111
Topic: The Advantages and Disadvantages of General Mathematics at the College Level
Leader: James H. Zant, Oklahoma A. and M. College, Stillwater, Oklahoma

GROUP 11—Room 113
Topics for Discussion: Primary (Grades 3 and 4)
1. The Use of Multi-Sensory Aids for the Primary Child
2. Providing for all of the Children According to Their Ability
3. The Importance of Discovery
4. Graphic Presentation of Problems
5. The Social Importance of Arithmetic to the Primary Child

Leaders: Glada Cooprider, Chairman, Willard School, Wichita
Rachael Van Horn, Tulsa
Mary Hankinson, Martinson School, Wichita
Dorothy Carson, Hyde School, Wichita

GROUP 12—Room 114
Topics for Discussion: Upper Elementary (Grades 5 and 6)
1. How to Evaluate Student Learning
2. The Place of Home Work
3. The Relative Emphasis of Computation and Social Arithmetic
4. Effective Motivation for Learning
5. Legitimate Short Cuts that Help Rather than Confuse the Pupil

Leaders: Bona Gardey, Chairman, Tulsa
Betty Steele, Martinson School, Wichita
Louise Thompson, L'Ouverture School, Wichita
Alice Stephenson, Franklin School, Wichita

GROUP 13—Room 103
Topic: Of What Value Can a Case Study in Arithmetic be to a Classroom Teacher?
Leader: Ella Marth, Harris Teachers College, St. Louis, Missouri

GROUP 14—Room 104
Topic: What Should be the Mathematics Sequence for the Non-College Going Student?
Leader: Martha Hildebrandt, Proviso Township High School, Maywood, Illinois

GROUP 15—Room 105
Topic: Teaching Geometry to Develop Clear Thinking
Leader: Gilbert Ulmer, University of Kansas, Lawrence, Kansas

GROUP 16—Room 112
Topic: Which Visual Aid Will be Used Today?
Leader: Nelle Kitchens, Hickman High School, Columbia, Missouri

GROUP 17—Room 101
Topic: Teaching and Examination Techniques in First Year College Mathematics
Leader: Guy W. Smith, University of Kansas, Lawrence, Kansas

GROUP 18—Room 102
Topic: How can Teachers Stimulate Pupils to Think Carefully and to Enjoy Geometry?
Leader: Grace McMahon, Lincoln High School, Lincoln, Nebraska

12:30 P.M. Luncheon—Cafeteria, East High School

1:00 to 2:00 P.M. Mathematics Films—Room 320, East High School

2:00 to 4:00 P.M. Film Forum-Elementary School Films—Room 320 East High School
Led by Henry W. Syer, School of Education Boston University, Boston, Massachusetts

2:00 to 4:00 P.M. Junior High School Section—Room 204 East High School
Presiding: Agnes Herbert, Clifton Park Junior High School, Baltimore, Maryland

Along Came General Mathematics
Myrtle F. Mudd, Northeast Junior High School, Kansas City, Missouri

Helping Seventh Graders Learn by Doing
Edith Woolsey, Sanford Junior High School, Minneapolis, Minnesota

The Improvement of Instruction in General Mathematics Courses
Claude H. Brown, Central Missouri State College, Warrensburg, Missouri

2:00 to 4:00 P.M. Senior High School Section—Room 205, East High School
Presiding: H. W. Charlesworth, East High School, Denver, Colorado

Making Plane Geometry Interesting
Hattie C. Garrett, Istrouma High School, Baton Rouge, Louisiana

Equipping a Mathematics Classroom
Margaret Sumrall, Sunflower Junior College, Moorhead, Mississippi

Key Concepts Around which a Plane Geometry Course Might be Organized
T. E. Kellogg, University High School, Minneapolis, Minnesota

2:00 to 4:00 P.M. College Preparatory and College Section—Room 218 East High School
Presiding: Martha Hildebrandt, Proviso Township High School, Maywood, Illinois

Graphical Representation of the Complex Roots of an Algebraic Equation
S. Louise Beasley, Lindenwood College, St. Charles, Missouri

Unifying the Teaching of Trigonometry in the Secondary School
T. E. Rine, Illinois State Normal University, Normal, Illinois

High School Classes in Advanced Mathematics as Observed in the Stuyvesant High School and the Bronx High School of Science, New York City
Lottchen Lipp Hunter, Wichita High School East, Wichita, Kansas

The Needs of Beginning College Students in the Field of Business Mathematics
L. J. Dixon, Southwestern State College, Weatherford, Oklahoma

2:00 to 4:00 P.M. Teacher Training Section—Room 113, East High School
Presiding: F. Lynwood Wren, George Peabody College for Teachers, Nashville, Tennessee

How Can we Provide a Better Program of Student Teaching?
Elizabeth H. Zeigel, Delta State Teachers College, Cleveland, Mississippi

The Program of Integration in Mathematical Instruction
Aaron Bakst, New York University, New York, New York

ANNOUNCEMENTS

Registration Headquarters and Location of Meetings

All meetings will be held either in the Wichita High School East or in the Roosevelt Intermediate School. Both are located on East Douglas Avenue at 2301 and 2201 respectively and may be reached by College Hill or Eastborough buses or by taxis. These buildings are four blocks from U. S. Highway 54.

Registration

There will be a registration charge of fifty cents for members of the National Council, members of the Mathematical Association of America and for teachers in elementary schools. The fee for non-members and visitors is $1.50. Students planning to become teachers of mathematics are admitted without payment of registration fee but should register at the registration desk.

Hotels

Reservations for rooms should be made directly with hotels in Wichita. A partial list of hotels and rates is as follows:

Hotel	Single Room	Double Room	Number of Rooms
Allis 200 S. Broadway	$4.00	$6.00–7.50	350
Broadview 101 N. Waco	$4.00	$6.00–7.00	300
Commodore 222 E. Elm	$3.00–4.00	$5.00–8.00	109
Coronado 126 S. Main	$1.75–2.50	$2.75–3.50	54
Eaton 523 E. Douglas	$1.75–2.50	$3.00–4.00	110
Hamilton 234 S. Main	$1.75–2.25	$2.75–3.25	100
Kersting 320 N. Market	$1.50–2.00	$2.50–4.00	55
Lassen 155 N. Market	$3.25–6.00	$5.00–8.00	300
McClellan 201 S. Broadway	$3.00–3.50	$4.00–4.50	100
Skaer 231 S. Broadway	$2.00 up	$3.00 up	60

Banquet and Get-Acquainted Luncheon

The Get-Acquainted Luncheon will be held in the Cafeteria of the Wichita High School East on Thursday noon, December 29. The Banquet will be held at the Lassen Hotel on Thursday evening, December 29. Tickets for the Luncheon will be $1.25 and for the Banquet $2.75. Reservations should be made in advance by sending the required amount to Miss Winona McFall, Wichita High School East, Wichita, Kansas. If made by December 15, 1949, reservations will be acknowledged by mail.

Kappa Mu Epsilon Luncheon

A special luncheon for members of Kappa Mu Epsilon will be held on Friday, December 30 at the Wichita High School East. Reservations should be sent to Miss Laura Z. Greene, Department of Mathematics, Washburn Municipal University, Topeka, Kansas, not later than December 15.

Reservations for Discussion Groups and Clinics

Reservations for attendance should be made before December 15, 1949. First, second, and third choices of groups should be sent to

National Council of Teachers of Mathematics
212 Lunt Building, Northwestern University,
Evanston, Illinois

Textbooks and Commercial Teaching Aids

These will be on display in the corridors of the Wichita High School East. Inquiries for exhibit space should be directed to Mr. Anton S. Richert, Wichita High School East, Wichita, Kansas.

Films and Filmstrips.

A number of recent mathematical films and filmstrips will be shown during the meetings. A mimeographed list of titles and times of showing will be available at the registration table at the time of the meetings.

Exhibit of Mathematical Models

Schools are invited to exhibit their mathematical models and instructional materials. Arrangements for exhibit space should be made by writing to Miss Harriet Blazier, Hamilton Intermediate School, Wichita, Kansas.

Wichita is on the Frisco, Midland Valley, Missouri Pacific, Rock Island and Santa Fe Railroads. It is also an airport for Braniff, Continental, and Trans-World Airlines. There are bus connections from all directions by the Continental Bus System and the Hopkins Bus Lines. It is also served by Highways U. S. 54, U. S. 81, K15, K42, and K96. Wichita teachers state that "for the most part, the weather during the Christmas vacation is unusually good!"

Miscellaneous

For points not covered in the announcements, please correspond directly with the local chairman: Miss Lucy E. Hall Wichita High School North, Wichita, Kansas.

COMMITTEES

1. Program Committee

H. W. Charlesworth, Denver, Colorado; Nettie-Alice Doolittle, Columbia, Missouri; Delore Gammon, Wichita, Kansas; G. H. Jamison, Kirksville, Missouri; Houston T. Karnes, Baton Rouge, Louisiana; L. W. Lavengood, Tulsa, Oklahoma; Eunice Lewis, Norman, Oklahoma; John Mayor, Madison, Wisconsin; Clyde T. McCormick, Normal, Illinois; Kenneth Nickel, Wichita, Kansas; Martha Peterson, Lawrence, Kansas; Henry Syer, Boston, Massachusetts; Gilbert Ulmer, Lawrence, Kansas; Edith Woolsey, Minneapolis, Minnesota; James H. Zant, Stillwater, Oklahoma.

2. General Committees

(Members are from Wichita unless otherwise indicated)

Coordinating Committee

Lucy E. Hall, Chairman; Kenneth N. Nickel, Co-Chairman; Mrs. Mary Andrews; Elizabeth Baird; Harriet Blazier; Delore Gammon; Cecil B. Read; Charles Reagan; Laura W. Smith; E. B. Wedell.

Registration

Marjorie McMahon, Chairman; Elizabeth Baird; Fred W. Doepke; Gladys M. Jacques; Nelle Leichhardt; Charles Reagan; Faye Schmidt, Planeview, Kansas; Sister Vincentia.

Reservations

Winona McFall, Chairman; Geneva Brewer; Celia Canine; Mrs. Bess Rose Kendrick; Pirie Mulholland; Eleanor O'Connell; Carrie Wade.

Publicity

Gilbert Ulmer, State Chairman, Lawrence, Kansas; Mrs. Mary Andrews, Local Chairman; Lillian Ayers, Hutchinson, Kansas, Eunice Baker; Claude H. Brown, Warrensburg, Missouri; Alma Calvert, Topeka, Kansas; Lorena Cassidy; Sister Cecilia, Parsons, Kansas; Gladys Child; Ruth Clow; Nelle Cook, Kansas City, Kansas; Edith Ellis, Lincoln, Nebraska; Arthur Hoare; Iva Holroyd, Manhattan, Kansas; Eunice Lewis, Norman, Oklahoma; Mrs. Meda Newon; Mrs. Agnes Nibarger; O. I. Peterson, Emporia, Kansas; Florence Ross, Ellsworth, Kansas; Oscar Schaaf, Columbus, Ohio; Jennie Smith; R. G. Smith, Pittsburg, Kansas; Charles Tice, Abilene, Kansas.

Hospitality

Cecil B. Read, Chairman; Judith Dixon; Grover Dotzour; Odell Moseley; Laura Neville; Homer Popkins; Lewis Reagan; Zelma Zimmerman.

Recreation

T. Otho Cott, Chairman; Orville Pierce, Co-Chairman; Esther Benedict; W. R. Gearheart; Ozeta Hutchison; Ernest Kaufman; Charles Lamkins; Iva Malone; Wayne Maxwell; John J. Snodgrass; Marlin Wallace.

Get-Acquainted Luncheon

Nida Ella Logan, Chairman, Planeview, Kansas; W. R. Berges; Walter L. Cooper; Alice Hamilton; Manty Harris; Myrtle Ogg.

Banquet and Decorations

Adele Davis, Chairman; Mary Rosa Fronk; Margaret Knepper; Eugene Kraus; Ruth Layne; Bess Moore; Henry K. Sears; Laura Smith; Florence Walker; Ova Lee Locke.

School Exhibits

Harriet Blazier, Chairman; Margaret Bond; Robert J. Blackburn; Mary Braun; Myrtle Craid; Ethel Davis; Ruth DeTurk, Winfield, Kansas; David Holland; Mildred Ingram; Clara Peterson; Sister St. Maurice; Kjersti Swanson; Mrs. Jennie Thomas, Planeview, Kansas; Edith Whitted, Newton, Kansas, Verna Wrestler.

Commercial Exhibits

Anton S. Richert, Chairman; Josephine Fugate, Planeview, Kansas; Ray Hanna; Hugo Wedell.

Films and Filmstrips

W. A. Bonwell, Chairman; John Bowden; C. D. Miller.

Pre-Registration Form

Name _____

School Address _____

Home Address _____

Member of National Council of Teachers of Mathematics Yes ☐ No ☐

Banquet Reservation ☐ Enclose payment of $2.75

Luncheon Reservation Thursday ☐ Friday ☐

Enclose payment at $1.25 each

Tour of Wichita and Points of Interest ☐

Wednesday, 1:00 P.M. No Charge

Mail to Miss Winona McFall, Wichita High School East, Wichita 7, Kansas

Have You Heard?

By EDITH WOOLSEY
Sanford Junior High School, Minneapolis, Minn.

THE Christmas meeting of the National Council, in Wichita, promises to be the best winter meeting we have had yet. You read about it in the October issue of the TEACHER. What? You didn't? Then read the detailed program in this issue and see what is being planned for you. There are a few things you will want to take care of today:

1. Choose a hotel and write for a reservation.
2. Make sure of a place at the banquet by sending $2.75 for a reservation to Miss Winona McFall, Wichita High School East, Wichita.
3. Write to Miss Harriet Blazier, Hamilton Intermediate School, Wichita, to let her know how much space you will need for those models and other instructional aids you are going to exhibit.
4. Find out how to get to Wichita.

Perhaps we can give you some information about transportation. Wichita is located 137 miles southeast of the center of the United States. It can be reached by air, bus, automobile, or railroad. Three airlines are available: Braniff, Continental, and Trans-World. If you like bus travel take the Continental Bus System or the Hopkins Bus Lines. You are planning to drive? Five highways reach Wichita: US-54, US-81, K-15, K-42, and K-96. You say you prefer to go by railroad? You can reach Wichita by any one of five lines: Frisco, Midland Valley, Missouri Pacific, Rock Island, or Santa Fe. There is a stream-liner on the Santa Fe which leaves Chicago at 9:30 A.M. and reaches Wichita at 9:15 P.M.

In addition to the excellent program of sectional meetings, discussion groups, film forums, and exhibits, plans are being made to have a tour to visit some of the leading industries of the city. Wichita has many industries. It is famous for production of airplanes, heating and lighting equipment, household and office appliances, oil field and refinery equipment, flour, meat packing, feed, farm equipment, machinery in general, steel fabrication, various textiles, printing and publishing. Since the modern curriculum is geared to fit the community, a visit to some of the industries will give us a better understanding of the problems of the Wichita schools.

Wichita has an interesting history. Some people believe that Coronado, on an expedition from Mexico, visited the site of this city in 1541. From time to time other explorers visited the neighborhood, but the first settlement occurred in 1863 when the Wichita Indians, driven out of the present Oklahoma because of loyalty to the Union during the Civil War, built a village of grass huts on the site of Wichita. They remained there until 1868 when they departed and white settlers arrived to found the present town. In 1870 the population was 50. The census for 1948 showed 170,751 people within the city limits, and 199,755 in the metropolitan area.

Have you made up your mind? Can you afford to miss this meeting? That's all for now.

See you in Wichita, December 28–30.

Miscellanea—Mathematical, Historical, Pedagogical

By Phillip S. Jones
University of Michigan, Ann Arbor, Michigan

Mathematical Tables

Several persons who read last month's column expressed an interest in hearing about the journal cited there, *Mathematical Tables and Other Aids to Computation*. This journal is published quarterly by the National Research Council, Washington, D. C. It began publication in January, 1943 under the editorship of Raymond Clare Archibald, Chairman of the Council's Committee on Mathematical Tables and Other Aids to Computation.

Although each issue usually carries one lead article such as that by Frank M. Verzuh on "The Solution of Simultaneous Linear Equations with the Aid of the 602 Calculating Punch" which appeared in the July, 1949 issue, the greater part of the journal is bibliographical and critical. Each issue contains a department "Recent Mathematical Tables" which so far has reported upon 657 tables (the first 75 numbers were allotted to the tables discussed by Professor Archibald in an earlier series of articles in *Scripta Mathematica*). Other departments deal with "Mathematical Tables—Errata," "Unpublished Mathematical Tables," "Automatic Computing Machinery," "Other Aids to Computation," "Notes," "Queries—Replies."

Although most of the journal is not suitable for secondary school use, it will repay time spent in browsing. For example, Note 96 (Volume III, Number 25, January, 1949, p. 390 ff.) written by R. C. Archibald contains much of historical interest such as the fact that the word "trigonometry" was first printed in Pitiscus' *Trigonometria: sive De Solvtione Triangvlorvm Tractatus brevis & perspicuus*, published in 1595 at Heidelberg as the final part of *Sphaericorum Libri Tres* by Abraham Scultetus. Teachers and mathematicians will relish the phrase quoted by Archibald from the dedicatory epistle in the later, expanded editions of Pitiscus' *Trigonometriae:* "Good God! How great and how rare an ornament is affability among theologians! And how thoroughly desirable would it be in this age that all theologians be mathematicians, that is, that they be reasonable and gentle men."

Teachers will frequently find items of interest in the "Other Aids to Computation" section. For example, under this heading in the issue noted above, item 1 records an article on "A Duodecimal Slide Rule," by Kingsland Camp in *The Duodecimal Bulletin*, 4 (Oct., 1948), p. 7–12 as well as several other slide rules and nomographs in various journals.

An Historical Outline

At this point it is pertinent to note that the sixth edition of Professor Archibald's *Outline of the History of Mathematics* appeared in January, 1949 as Number 2 of the *Herbert Ellsworth Slaught Memorial Papers* of the Mathematical Association of America. It may be purchased for one dollar from the Secretary-Treasurer of the Association, Professor M. H. Gehman of the University of Buffalo. The earlier editions are so well known that it is hardly necessary even to note that the booklet is more than a mere "outline" (though it does present an excellent 7 page "Synopsis" which is then expanded into 50 pages of discussion), but through its extensive "Literature List and Notes," it is an extraordinarily fine guide to readings in and sources for the details of mathematical history.

Uncle Sam's Helps

Dorothea Ammerman of Kirkwood, Missouri and William Wang of Midland,

Michigan, war-time meteorologists, call my attention to the materials available from the United States Weather Bureau. Teachers identifying themselves as such will be sent upon request to the "Chief U. S. Weather Bureau, Washington 25, D. C." one set of the Bureau's *Education Series*. Additional copies of this set of eight publications are sold for 20 cents per set by the Superintendent of Documents, Washington 25, D. C. We have space here to comment on only one item, the Weather Map, however the Price List which is included in the set will tell of many other publications which with some ingenuity and planning may be adjuncts to mathematics teaching.

The map as a whole serves as an illustration of the use of mathematics in the service of farmers, aviators, contractors, and all others using weather data. Every one of the many entries upon it has some mathematical basis or connection; e.g. for each station are shown temperature, barometric pressure, pressure change, wind velocity and direction, distance of visibility, height of cloud base.

The entries for pressure change are signed numbers and hence illustrate two mathematical concepts: (1) that not merely the value of a function but also its rate and direction of change may be important (this idea should be included in our teaching of graphs, tables, formulas, and the function concept in general), (2) that every measurement is the difference between two readings (second reading minus first reading). The proper use of signed numbers makes this one "word-formula" both applicable in *all* cases and productive of a better description of the variable being measured. The change in barometric pressure entry on the map illustrates both ideas; namely, the entry shows not only the amount of change but also, by its sign, the direction of change.

The graphical conversion scale for changing inches of mercury to millibars could well be the basis for a problem in determining an equation and a rectangular graph from numerical data as well as the stimulus for constructing or collecting similar linear scales.

The isobaric lines invite comparison with contour maps and discussions of different schemes for representing three variables graphically. From them a pressure "profile" of the United States could be constructed for several latitudes, and if made for successive days such profiles would shed light on the movement of areas of high or low pressure.

One of the most interesting features of the map is its explanation and use of codes and symbols in reporting and recording data. Anyone who considers teaching the concept of symbolism to be one of the tasks of elementary mathematics instruction will find interesting enrichment material of a partially non-mathematical nature here.

It must be left to you readers to discover further uses of the maps and to note in other publications the many occurrences of means, per cent, tables, graphs, and decimals. Here is some raw material for correlating mathematics with geography, general science, social studies. A subscription to the Daily Weather Map is 60 cents per month. Bulk copies for educational purposes may be purchased at 2 cents per map. See pages 3 and 4 of the Price List noted above for further information.

Geometric Models Kit

PLEASE NOTE that the Geometric Models Unit, No. 102 is to be ordered from Professor Ahrendt, Anderson College, Anderson, Indiana and NOT from THE MATHEMATICS TEACHER.

Arithmetic

A New Section of The Mathematics Teacher

By Dr. Ben A. Sueltz, *State Teachers College, Cortland, N. Y.*

The National Council has long been interested in the field of arithmetic both in the elementary schools and in the secondary schools. The national and regional meetings of the Council featured discussions of arithmetic and these programs have been very well attended. The Tenth and Sixteenth Yearbooks were devoted to arithmetic and these proved to be among the most popular of the yearbooks. The journal, The Mathematics Teacher, has carried a number of important articles on arithmetic. Beginning with the current issue of The Teacher a special section will be devoted to arithmetic. President Hildebrandt and the executive board have the ideal of making the National Council a clearing house of ideas and practices dealing with arithmetic and to that end have asked Mr. Ben A. Sueltz, State Teachers College, Cortland, New York, to be responsible for such a section for each issue during the coming year. He has agreed to do this on a temporary basis and should like to have copies of speeches, papers, discussions, and other materials dealing with arithmetic sent to him.

Arithmetic is very important in the whole program of mathematics teaching. Not only does it represent the area that is most readily functional to pupils and adults but also it provides a basis for all subsequent mathematics. This basis can be good or poor depending upon the content and the modes of learning. Changes in point of view toward arithmetic and in school procedures are taking place. The members of the National Council should know what is going on and perhaps should take a position of leadership.

In The Mathematics Teacher for April, 1949, Dr. Sueltz presented "Important Issues in Arithmetic." These can serve as a preliminary basis of discussion and should suggest articles that readers might wish to prepare or cause to be prepared. The April article raised questions under five headings: I. The Philosophy of Arithmetic Instruction; II. Aims of Arithmetic Instruction; III. Modes of Learning Arithmetic; IV. School Practices in Arithmetic; and V. Evaluation and Research in Arithmetic. The National Council will welcome open and frank discussion of conflicting points of view hoping thereby to stimulate thinking toward better arithmetic instruction. A limited number of reprints of Dr. Sueltz's article are available from the author.

While the majority of members of the National Council are secondary school teachers of mathematics, it is important for them to realize the dependence of their program upon effective work in the elementary schools. The divergence of elementary school programs is at present greater than it has been at any time during the past century. This divergence applies to all phases of arithmetic: to modes of learning, to content, to seriousness of purpose on the part of both the school and the pupil, and to the point of view toward the role of arithmetic in the life of an individual. Perhaps the greatest single unifying influence at the moment is the similarity of content of the textbooks. What valuable service can The Mathematics Teacher, through a section devoted to arithmetic, perform for the schools? What are some of the newer developments in the field? What are the salient features of outstanding courses of study? Where are significant advances being made in the field of evaluation? What researches, probably unpublished, should be made available to our readers? How and where is arithmetic being learned with meaning and understanding so that children become real functional members of society? There are many questions that might be explored in this new section of The Mathematics Teacher. Send your suggestions and materials to the author.

Membership Message

By Mary C. Rogers
Chairman of Membership Honor Schools, Roosevelt Junior High School, Westfield, New Jersey

The National Council of Teachers of Mathematics brings cordial greetings to you and your colleagues and extends best wishes for a continuance and enhancement of the excellent professional services which you are rendering in your classrooms and in your communities—both local and country-wide.

You are a part of a great and growing organization—your National Council. You have made it so by your enthusiastic support, and by your generous contributions and outstanding services in the many and varied activities which the Council sponsors. Your cooperation and active participation are greatly appreciated.

There are so many more things which we can do, *working together* toward the furtherance and improvement of Mathematics Education. Your Council is continuously planning and promoting new services, while improving and strengthening those already well established. This expanding program can only be maximally functional through the endorsement and active support of every teacher of mathematics, from every level of education, throughout the country.

To this end, we want you to know more about the Council and its work—its achievements and expanding interests—current developments in the realization of professional policies and programs.

It has been stated that an organization can only be as great and strong as the personnel of which it is comprised. What of the Membership record of our Council? Dr. Hildebrandt has asked me to study this record with you, analyzing our current Membership status, studying plans for growth and expansion, and soliciting your optimum cooperation in the realization of these plans.

First of all, we are a growing organization. Not only is growth currently persistent, but over the years there has been a steadily increasing rate of change. We have found the accompanying analysis of total Membership growth informative and helpful. We submit it to you for your use in planning your response to this year's Membership campaign. Study it carefully. Note the goal for Membership which we suggest for next year. Is it reasonable? If so, what part can you and your school play in reaching this goal? What can your Council do to help?

What has been the record of your State in this over-all picture? Study the following analysis and lay your plans accordingly.

It is interesting to note that only five States have made CONTINUOUS GROWTH over the period of time reported here. They are:

Pennsylvania
Florida
Maryland
Tennessee
Mississippi

Twenty-six other States, however, showed only one record of comparatively small loss which was later generously retrieved.

As would naturally be expected, the greatest Membership returns have come from the most populous States. The following lists are quite significant.

Analysis of Total Membership Growth

Date	Jan. 1947	Jan. 1948	May 1948	Mar. 1949	May 1949	May 1950
Membership	5932	6243	6873	7037	8285	10,000
Per cent of increase		5.2	10.1	2.4	17.7	20.7

MEMBERSHIP GROWTH BY STATES

States	January 1947	January 1948	May 1948	March 1949	May 1949	Average per cent of change per period given
Illinois	475	473	497	567	575	5.2
New York	513	643	660	644	554	2.9
*Pennsylvania	412	438	463	478	515	5.7
Ohio	348	331	358	417	417	5.0
New Jersey	277	312	336	325	318	3.7
Indiana	137	318	349	318	317	32.2
California	264	291	317	298	296	3.1
Michigan	241	213	226	248	256	1.9
Massachusetts	229	238	249	250	249	4.3
Texas	200	208	228	224	245	5.3
Wisconsin	179	197	203	188	193	2.1
*Florida	102	130	136	161	188	16.8
Virginia	114	123	141	187	186	13.7
Minnesota	138	144	163	179	178	6.7
*Maryland	112	114	124	136	171	11.3
Iowa	129	107	122	144	162	6.9
Louisiana	80	100	98	153	161	21.1
Kansas	166	150	150	149	150	2.4
North Carolina	103	96	140	158	149	11.6
Missouri	133	122	123	146	145	2.7
District of Columbia	105	132	131	120	135	7.3
Oklahoma	97	81	103	113	126	8.0
Connecticut	119	114	120	128	125	1.4
*Tennessee	88	97	99	101	125	11.8
Colorado	80	75	81	107	117	9.8
Oregon	77	80	74	84	100	7.3
Nebraska	79	78	91	98	98	5.8
Alabama	79	77	86	88	97	4.7
Kentucky	69	68	80	90	96	8.9
Arkansas	64	58	61	78	79	6.3
West Virginia	43	52	54	52	74	15.8
Washington	76	67	70	66	71	1.4
South Carolina	64	86	86	70	71	4.3
Georgia	40	67	77	71	68	17.6
*Mississippi	34	42	43	49	55	13.0
Rhode Island	37	36	39	42	45	15.1
Arizona	17	26	28	41	40	26.2
New Mexico	18	42	35	30	32	27.3
New Hampshire	21	31	32	27	30	11.6
Delaware	23	24	24	24	30	7.3
Maine	34	28	31	31	29	3.4
South Dakota	21	25	26	27	26	5.8
Montana	20	24	24	25	25	6.1
Vermont	16	27	27	25	25	15.4
Wyoming	19	26	26	19	19	2.5
North Dakota	19	15	21	18	18	1.2
Utah	13	10	13	14	16	7.2
Idaho	4	7	6	8	9	26.6
Nevada	4	10	8	8	9	35.6

Ten States—Greatest Membership May 1949

- Illinois
- New York
- Pennsylvania
- Ohio
- New Jersey
- Indiana
- California
- Michigan
- Massachusetts
- Texas

Ten Most Populous States

- New York
- Pennsylvania
- Illinois
- Ohio
- California
- Texas

- Michigan
- Massachusetts
- New Jersey

Missouri

In recognition of the splendid work for National Council Membership also being done in the less populous States, we have made two other studies.

1. Membership on a pro rata basis.

Not being able to learn the number of teachers of mathematics in the various States, we have determined total population by States and then pro rated Membership returns by the 100,000 population. This study gives the following results. We think they are very interesting and quite a challenge to the more populous States.

States	Membership Returns per 100,000 Population
District of Columbia	19.3
Colorado	10.6
Delaware	10.0
Florida	9.9
Maryland	9.5
Indiana	9.3
Oregon	9.1
Nevada	9.0
Kansas	8.3
Arizona	8.0
New Jersey	7.6
Nebraska	7.5
Connecticut	7.4
Illinois	7.3
New Hampshire	7.3

2. Average Membership Growth per periods of time listed in this report.

States	Greatest Relative Growth by Periods
Nevada	35.6%
Indiana	32.2%
New Mexico	27.3%
Idaho	26.6%
Arizona	26.2%
Louisiana	21.1%
Georgia	17.6%
Florida	16.8%
West Virginia	15.8%
Vermont	15.4%
Virginia	13.7%
Mississippi	13.0%
Tennessee	11.8%
New Hampshire	11.6%
North Carolina	11.6%

We are particularly happy to present to you this Membership study, for it shows such excellent cooperation, in one way or another, on the part of so very many of the States. Please accept our sincere thanks for this commendable achievement.

But what about the many public and private schools and colleges in these various States? What about the individual teachers who make up the Mathematics faculties in these schools? Are we "losing sight of the trees for the forest"? After all, it is the *Individuals* who have made this report possible. Can we not recognize this cooperation and support in some substantial way? This is our plan.

MEMBERSHIP REPORT TO THE NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS

SCHOOL.....

SCHOOL ADDRESS.....

.....

NUMBER OF TEACHERS OF MATHEMATICS IN YOUR SCHOOL.....

NUMBER OF NATIONAL COUNCIL MEMBERS.....

REPORT SUBMITTED BY.....

YOUR ADDRESS.....

.....

We are confident that many schools throughout the Country have 100% Membership in National Council; that there are still others, all of whose mathematics teachers but one belong to the Council. We plan to give such schools special recognition in the pages of THE MATHEMATICS TEACHER. These would be designated as our Honor Schools.

We need the assistance of each of you in locating these schools. Will you help us? Simply copy and complete the accompanying form and mail it to

Miss Mary C. Rogers
462 North Avenue, East
Westfield, New Jersey

If such reports are in our hands by December 1, 1949, we shall guarantee the appearance of our first Honor List not later than the March 1950 issue of THE MATHEMATICS TEACHER. Revised lists will appear periodically in subsequent issues of THE MATHEMATICS TEACHER. If your school does not now qualify for this recognition, talk to your fellow-teachers about the benefits which you have derived from membership in National Council and urge them to join us also.

We shall anticipate hearing from you during the coming months. Please accept our sincere thanks for your cooperation and assistance.

Contests and Scholarships

A report on contests and scholarships for high school students of mathematics appeared in the October number of THE MATHEMATICS TEACHER under the title "Would Contests and Scholarships Contribute to Increased Interest in Mathematics?" This report revealed that teachers had little information about such competitive activities, except as they were held in their immediate localities. It was therefore recommended to the Board of Directors of the National Council that THE MATHEMATICS TEACHER carry a special section, on a temporary basis, devoted to contests and scholarships so that more information would be available to those interested.

Professor Hildebrandt has also appointed a Committee on Contests and Scholarships which is anxious to collect information on all contests and scholarships in mathematics open to high school students. The success of this section and of the Committee will depend on your cooperation. Please send to any member of the Committee or to the editor of THE MATHEMATICS TEACHER, announcements and reports of contests and scholarships in mathematics in which your students have participated or in connection with which you have a responsibility. Other teachers are anxious to learn of your contest experiences.

The Committee members are:

Walter H. Carnahan, Education Building, Purdue University, Lafayette, Indiana.
Houston T. Karnes, Department of Mathematics, Louisiana State University, Baton Rouge 3, Louisiana.
John R. Mayor, North Hall, University of Wisconsin, Madison 6, Wisconsin, Chairman.
Mary C. Rogers, 425 Baker Avenue, Westfield, New Jersey.
Marie S. Wilcox, 4010 Ruckle Street, Indianapolis 5, Indiana.

Interscholastic Academic Contests in Indiana

By MARY F. ANDERSON
Division of Adult Education and Public Services,
Indiana University, Bloomington, Indiana

THERE are a few states in this country in which interscholastic academic competition takes on a bit of the excitement generally reserved for athletic and musical contests. Indiana is one of these. Latin and mathematics inter-high-school contests were established here many years ago by teachers' organizations in the State and have persisted with continually increasing vigor. English has recently been added to the contest program and plans are under way for extending the fields of subject matter farther.

At the inception of the contests the State University was asked for and gave help in administering them. As the program grew, the University assumed more and more direction of it, the practical difficulties in the way of administration by a group so scattered and so busy as the high-school teachers encouraging this shift of administrative responsibility. Today the University takes full administrative charge of the contests, with high-school teachers and administrators serving in many advisory and consultative capacities. About nine tenths of the expense of this High-School Achievement Program is now borne by the University, the rest being covered by an enrollment fee of one dollar per school per contest.

For more than thirty years these contests have been an annual spring tonic for many teachers and a check on progress for others. For pupils they have represented traditional honors to be striven for and a good time to be anticipated. Last spring about 1400 pupils, accompanied by approximately 600 teachers, traveled to the campus of the University to write final examinations; more than twice this number had entered the preliminary contests. The rewards were only small medals and the publication of top-scoring names on mimeographed lists that were sent to all participating high schools and affected local newspapers, and, in the case of senior students, to the boards of admissions of colleges in Indiana and neighboring states. Many of the contestants in the finals travelled six or seven hours to these examinations and about six hundred of them, of choice or necessity, went to the additional expense of staying in Bloomington over one or two nights. There is unquestionably a large body of opinion in Indiana that the contests are worth while.

In the past few years examination questions have been made up by faculty members of various colleges in the State. Previously high-school teachers wrote the examination questions, and there is still some weight of preference for their questions.

Preliminary contest examinations—commonly known as "regionals"—in the mechanics of English, in four divisions of Latin, and in algebra, geometry, and comprehensive mathematics are given in about forty cities or towns of the State at an hour announced several months in advance. They are generally given on the first Saturday after the basketball tournament ends, about the end of March. Participating teachers, appointed by the Bloomington office, serve as chairmen of the various contests at these regional centers. Every secondary school in Indiana is permitted to enter two students in each of the regional examinations, eligibility depending only on class rank and number of courses taken in the subject of the examination. Schools with an enrollment of more than five hundred are permitted to enter one extra contestant for each additional thousand or fraction thereof of enrollment. Schools make their

own selection of contestants and choose the centers at which they will write the examinations.

Examinations at both regionals and finals are scored by teachers working in groups under the direction of chairmen. Construction and proof problems in the geometry and comprehensive examinations are scored in the Bloomington offices of the contest administration, but all other questions are theoretically adapted to objective scoring and are scored by the teachers immediately after the papers are written. Questions of intérpretation inevitably arise, however, and on all performance affected by these scoring is checked in the Bloomington office.

Final examinations are given on the University campus about the fourth Saturday after the regionals. Contestants are selected to enter these final contests on the basis of performance on the regionals. The top-placing contestant at every regional contest in which six or more papers were written is invited to the finals, as are as many of the top-placing students from the State as a whole as can be accommodated. The proportion varies from about one-fourth to one-half the regional contestants.

The examinations are scheduled for nine o'clock Saturday morning. While the contestants are writing, the teachers meet first for general and then for departmental discussions of questions of contest policy and practice. Lectures, demonstrations, and exhibits in the fields of the various contests are planned for the late morning and early afternoon for both pupils and teachers. Teachers begin scoring papers as soon as the first ones are turned in, about ten-thirty or eleven in some divisions. Some chairmen prefer to have all participating teachers work at the grading; others believe better work can be done in less time by smaller groups. All teachers with pupils in the contests are, however, on call to assist with grading. Last spring a country-dance party was arranged for the contest visitors for Friday evening. Baseball games, conducted tours of the campus, music and dramatic programs, and various other campus activities, make the week-end sufficiently varied so that every visitor can find entertainment or instruction or stimulation in line with his special interests and can suit his own pace. The only event planned for the group as a whole is an auditorium program late Saturday afternoon for the awarding of gold, silver, and bronze medals to the three top-scoring contestants in every division.

Change in Price Notice

The Board of Directors of The National Council of Teachers of Mathematics has decided that additional funds must be provided to carry on the work of the Council. Hence the Board voted unanimously to increase the cost of THE MATHEMATICS TEACHER to schools, colleges and libraries from $3.00 a year to $5.00 a year. This new rate will take effect January 1, 1950. That is, subscriptions paid for on January 1, 1950 or thereafter will be $5.00 if paid for by schools, colleges and libraries, $3.00 if paid for by individuals. All of this additional income will be used to carry on special projects by the Council, not for office overhead.

Group Affiliation with the National Council

By H. W. Charlesworth

Chairman of Affiliated Groups, East High School, Denver, Colorado

The first of this series of articles appeared in the October issue of The Mathematics Teacher. The situation of affiliation was briefly summarized in that article, the need for a more effective type of affiliation was shown, announcement of the Delegate Assembly at the 1950 Chicago convention was made, groups which have been affiliated with the National Council were asked to renew their affiliation by December 1, and new affiliations were invited.

It is the ambition of your chairman that affiliation be made more meaningful and that it be more helpful to both the affiliated groups and to the National Council. Since it is a cooperative matter, we must work together. We are staking much faith in the results of the Delegate Assembly. Proper planning for it, free exchange of ideas during the assembly, wise agreements and decisions will accomplish much. Two things are necessary, if the National Council is to be of greater help to the affiliated groups; first, the desire on the part of groups for the interchange of ideas and efforts, second, some hard and sacrificial work on the part of the groups and the individual leaders in these groups.

There seems to be no question about the desire for improved affiliation. For several years now there has been increased evidence of it. I have no doubt about the willingness of mathematics teachers to work and their ability to accomplish results. I have worked with mathematics teachers a good many years and have observed what they can do when they set out determined to do it. We need only to look around a bit to find plenty of evidence of what mathematics teachers have done and are now doing all over the country, individually and in groups. Having the desire to combine our efforts and the ability to produce results, we need now a good plan of procedure.

To get our plan under way, affiliated groups must accept a few responsibilities now. First, send to me before December 1 the renewal of your affiliation. Blanks for the purpose were sent out in September. If you did not receive this blank, please write to me immediately. Second, select as soon as possible the *one* delegate that your group will send to represent you at the Delegate Assembly in Chicago. We shall want the name of this person by March 1, 1950, along with brief statements of questions or issues he will bring before the Delegate Assembly. The delegate you choose should be a member of *The National Council of Teachers of Mathematics*, and, of course, should be able to represent the desires and ideas of your group. Third, send to me suggestions for the improvement of affiliation. We shall assemble these suggestions before the meeting of delegates, thereby expediting the work of the Assembly. Fourth, keep us posted on the activities of your group. It would be well to have one person designated to do this. Officers of groups should accept these responsibilities, but all members of groups should share in them, at least to the extent of seeing that these things are done.

New affiliations are invited. If your group desires affiliation, please write directly to me. Renewal and new affiliations completed by December 1 will be listed in the March 1950 issue of The Mathematics Teacher, giving names of officers, date of original affiliation, number of members, etc. We are inviting affiliation of groups of *teachers of mathematics*, elementary through junior college, local, state, district or regional groups. We cannot include student groups, college or high

school clubs, now; plans for affiliation of these may be worked out later.

Several state-wide groups have been organized recently and call themselves (*Name of state*) *Council of Teachers of Mathematics*. Some of these have already completed their affiliation with the National Council, others are planning to do so soon. The idea of a *state council of teachers of mathematics* seems good in many instances, particularly where the geographic area is not too large. A few larger states might well have more than one organization. In a few instances, two or more states might group together to organize a multi-state or regional association of mathematics teachers. Larger groups, with the smaller groups working as a part of the larger group, may have certain advantages. It is quite likely that the larger group would bear more weight where state or regional matters pertaining to mathematics were involved, particularly so if this group were also affiliated with the *National Council*. It is to be expected that such organizations of teachers will want to influence the thinking relative to mathematics curricula and mathematics teaching in their respective areas. A state or regional organization, backed by affiliation with the *National Council*, could hope to accomplish more than the strictly local organization. However, the National Council does not wish to designate the size of territory covered by an affiliated group. This is a matter for the localities themselves to decide. It would be well, however, for localities everywhere to consider the matter and the advisability of expanding both territory and efforts. Present local organizations need not be disbanded nor affiliation of them with the National Council discontinued, better that these local organizations continue and feed into the larger district, state, or regional organization. But, don't have a state or regional organization just for the sake of having one!

Let me pass on to you a few ideas that I have gleaned from my correspondence with groups. These may be of some help to you. Limit the activities of the group to serving those functions which it is distinctly equipped to serve. Do not try to serve functions which are already being handled by other groups. Rather than duplicating the good efforts of another group, voice your support of such efforts and let them have the credit for doing it. Set up definite machinery for coordination of efforts with related organizations. Arrange for a continuance of leadership in your group, avoiding the necessity of electing an entire new set of officers each year. Keep the constitution and administrative machinery as simple and flexible as possible. The effectiveness of the group depends most upon good active leadership, leaders who see and feel the value of professional organizations and who will unselfishly devote time and energy to it.

The cooperation of working groups all over the country will help realize our desire and determination to improve the teaching of mathematics throughout the country, even in the smallest schools. We shall be helping to accomplish the objective of The National Council, which is, "the advancement of mathematics teaching in elementary and secondary school."

ATTENTION! AFFILIATED GROUPS!

Renewal of affiliation must be in by December 1, if the name of your group is to appear in the list to be published in the March issue of "The Mathematics Teacher." New affiliations completed by December 1 will be included in this list.

Concerning matters of affiliation, please write directly to H. W. Charlesworth, East High School, Denver, Colorado.

AIDS TO TEACHING

HENRY W. SYER
School of Education
Boston University
Boston, Massachusetts

DONOVAN A. JOHNSON
College of Education
University of Minnesota
Minneapolis, Minnesota

BOOKLETS

B.26—Some Suggestions for Teaching Geometry to Develop Clear Thinking

University of Kansas Publications; Lawrence, Kansas

Pamphlet: 6″×9″; 20 pages; Gilbert Ulmer, Author; Free.

Description: This issue of *Kansas Studies in Education* contains materials and suggestions for teaching geometry to develop an understanding of clear thinking in non-geometric situations. Suggestions are given for the study of the following points both in non-geometric and in geometric affairs: (1) defining key words (2) generalization (3) reasoned by analogy (4) detecting implicit assumptions (5) inverses, converses (6) indirect proof (7) name calling. Methods of leading the pupil to discover relationships for himself are outlined.

Appraisal: Since studies have shown that the use of non-geometric materials results in improved understanding of geometric relationships, geometry teachers will welcome the material in this pamphlet. This pamphlet furnishes the geometry teacher with a great number of appropriate non-geometric situations to supplement instruction in methods of logical reasoning. However, there may be some doubt as to whether or not the most important purpose of geometry is to develop critical thinking.

CHARTS

C.10—Combest Mensuration Charts

Banks Upshaw & Company; 707 Browder Street; Dallas, Texas

23″×30″; $7.60 per set of seven ($1.20 each).

Description: Basic geometric figures and descriptive titles and statements are neatly lithographed on cloth charts; metal strips along the top and bottom of the charts cause them to hang correctly while being displayed. The seven charts are entitled: (1) A Polygon Family, (2) An Approach to Areas, (3) Areas, (4) Lateral Areas, (5) Convex Surfaces, (6) Volumes of Solids, and (7) Volumes. Simple line diagrams illustrate the common polygons encountered in the study of intuitive geometry and the means of deriving formulas for determining the areas and volumes of these planes and solids. The derivations are intuitive and, as each new formula is found it is compared with the corresponding formula which applies to the rectangle or rectangular prism. This stress on relationships among the formulas is certainly desirable and is emphasized by repetition.

Miniature reproductions ($5\frac{5}{7}$″×$7\frac{1}{8}$″) of the charts have been printed on heavy tag paper and may be purchased for $.56 per package of twenty-five cards. They are printed against a drab, unstimulating cream-color background but the information contained is identical to that on the larger charts. Each of the cards is accompanied by a sheet of questions whose answers indicate an understanding of the concepts portrayed by the chart. These cards are meant to be used as individual aids which should be placed in the hands of each student.

A twenty-page manual of directions (price, $.25) is also available; it describes in detail the significance of each chart and contains much common but valuable in-

formation on the teaching of mensuration.

Appraisal: The teaching of mensuration can easily become abstract and meaningless when concrete aids are not used to enrich the topics under discussion. These charts are compact and portray concepts which are considered from the time the various polygons are introduced until the final review of volumes. They by no means replace actual experimentation with plane and solid figures; Combest is cognizant of this fact for his manual of directions emphasizes the need of experimentation. The lists of exercises which accompany the chart cards also display recognition of the place of student discovery as an excellent means of developing formulas. Such activities are probably more important at the lower grade levels where students are less capable of formal proofs which involve manipulation of equations.

Where limited funds prohibit procurement of both the charts and cards, it may be advisable to purchase only the cards. Their more direct appeal to the students seems to be more valuable than the group instruction necessitated by the charts. (Reviewed by Bernard Singer, Hyannis, Massachusetts).

EQUIPMENT

E.22—Teach-A-Number Kit

Teach-A-Number Company; 725 Poydras Street; New Orleans, Louisiana

Description: All of the number blocks which comprise this set are $1\frac{1}{2}''$ by $1\frac{3}{4}''$ but vary in thickness. The number one blocks are each $\frac{1}{4}''$ thick, the number two blocks are each $\frac{1}{2}''$ thick, and so on by $\frac{1}{4}''$ step increases for each of the digits through ten. A different colored block is used for each of the digits, and the blocks are appropriately labeled with both the notation and the word for each digit. One of the suggested values for the blocks is that the relative sizes can be used to teach the meanings for each of the numbers. For example, when a pupil can match a THREE block and three ONE blocks, he can prove that three ONE's equal THREE. Another suggested value is that the fundamental operations with whole numbers can be learned by manipulating the blocks. For instance, blocks TWO, FOUR, and THREE can be stacked beside block NINE to prove the addition. Comparable manipulations can be made for subtraction, multiplication and division within the limitations of size and numbers of blocks available. Other values suggested in the manual include using the kit for number combinations, simple fractions, decimals, and association of number words and the numerals.

Appraisal: These blocks approach the teaching of number through the idea of comparative sizes. The relationship between counting number and measurement number is important, but beginners in number work will have difficulty in seeing the idea of threeness in the THREE block as such. Consequently, the use of these blocks should be deferred until pupils have matched natural units with natural units, and have had considerable experience with the idea of number as applied to component and total groups which are made up of natural units. Likewise, in experiences such as stacking three various sized blocks beside a larger block to find a total, it must be realized that the symbol on the larger block and not the quantity of the blocks is the important aspect for the child. For the teacher who is fully aware of the steps in developing the ideas of number in the counting and in the measurement situations, these blocks offer some unique possibilities, as they can be used for fractions readiness, ideas of measurement without standardized units, and so on as well as some of the uses suggested in the manual. The teacher must never, however, forget that the number property of the FIVE block will probably not stand out as clearly as five separate units.

The blocks are of wood, quite durable and should stand hard usage. Because of multiple possibilities for use, no specific grade level can be designated for this kit.

(Reviewed by Robert L. Burch, Boston University).

FILMS

F.40—Ratio and Proportion

Knowledge Builders; 625 Madison Ave.; New York, New York

16mm film; black and white; sound; 1 reel; $40; 1948.

Content: This film introduces the use of ratios by showing how ratios are used to determine the batting average of a baseball player. The making of jam by a recipe is used to form a proportion which is solved by cross multiplication. A literal proportion is written and the various ways of manipulating the terms in the proportion are discussed. The use of ratio and proportion are then illustrated by use of such devices as lathes and adding machines. A complete problem on gear ratios is illustrated with turning gears in mesh and solved.

Appraisal: One of the major difficulties of this film is that it includes considerable material on the solution of a proportion which can be done just as well on the blackboard as in a film. Another criticism is that the measuring instruments used, as cups of berries and cups of sugar, are not exact units of measurement. Some teachers will object to the solution of proportions by cross multiplication. The photography is satisfactory but the content of film lacks interest.

FILMSTRIPS

FS.57—Graphs

Society for Visual Education; 100 East Ohio Street; Chicago, Illinois

Filmstrip; 35mm; 55 frames; black and white; $2.00; 1948.

Content: This filmstrip shows what graphs are, basic principles in drawing graphs and reading graphs, and how graphs are used. It begins by illustrating the value of a graph for picturing number facts by relating it to the use of pictures in daily life. The reading and construction of pictographs, bar graphs, line graphs, and circle graphs are discussed. Basic principles of graphing, such as, "graphs should show comparisons not isolated statements," or "graphs should compare approximate quantities not minute details," are emphasized. Examples are given of the use of graphs in business, engineering, aviation, and the study of economic and social change. The filmstrip ends by giving six questions on the identification and reading of graphs.

Appraisal: The most effective part of this filmstrip is its emphasis on basic principles of graphing, each one illustrated by a graph. It also furnishes a variety of applications. However, the selection of graphs of material related to adolescent activities would be more interesting to the pupil than graphs of the production of grains or petroleum. Although basic principles are stated in a concise manner, the use of expressions such as "isolated statements," "self-explanatory" or "factors" will not be meaningful to seventh grade pupils. This filmstrip should assist the teaching of graphing but it should not supplant the use of opaque projections or bulletin board displays or blackboard drawings of graphs of local or up-to-date data. This filmstrip was produced for grades 7–9.

INSTRUMENTS

I.12—Plain English Micrometer Caliper (72662)

I.13—Plain Metric Micrometer Caliper (72657)

Central Scientific Company; 1700 Irving Park Road; Chicago 13, Illinois

$3.25 each

Description: The small micrometers have black cast steel frames. They are of durable construction and although the graduations are crudely impressed in the instruments, they are sufficiently accurate for teaching purposes. The vernier attachments aid the user in reading the

English-scale micrometer to the nearest 0.001 inch for measurements as large as one inch. The metric model measures accurately within 0.01 mm. and its range extends from 0 to 25 mm. Both instruments are sturdily constructed.

Appraisal: Teaching the use of precision measuring instruments falls logically into the curriculum of shop mathematics but may likewise be included in the course of study of general mathematics. It is entirely conceivable that many more students who study these courses will eventually make greater use of such tools than will the college-preparatory pupils who learn to manipulate the micrometer in the physics laboratory.

The particular instruments do not offer sufficient precision for scientific work but are sufficiently accurate for classroom purposes; their mechanical simplicity is a desirable characteristic.

Instruction with such tools is particularly meaningful to the many students who plan to become skilled laborers and the mere fact that the instrument is used somewhat extensively by machinists and other shop-workers will supply intrinsic interest. In many schools it will be possible to purchase the instruments in quantities for their usefulness applies to the physical and shop departments as well as to the mathematics department. Each student should have the opportunity to become fairly proficient in operating the device through actual measurement of objects. The price of the instrument is proportional to the educational value derived therefrom. (Reviewed by Bernard Singer; Hyannis, Massachusetts).

I.14—Vernier Caliper (73877)

Central Scientific company; 1700 Irving Park Road; Chicago 13, Illinois

($7\frac{1}{4}''$ long, $4.20 each).

Description: A steel vernier caliper contains scales for measuring in both the English and metric systems. One end of the calipers contains fixed jaws for making inner and outer measurements and a vernier is attached to the sliding jaws. Readings may be made to within 1/125 inch on the English scale and to the nearest 1/10 millimeter on the metric scale. The largest measurements obtained with the instrument are five inches and 120 millimeters on the English and metric scales respectively.

The calipers are very well constructed.

Appraisal: The vernier caliper should be used in shop mathematics courses to introduce the students to a measuring instrument which is commonly used in the shop and laboratory. Use of the vernier itself is important for it appears on many types of precision instruments including the important micrometer. Since the vernier attached to these calipers is of very simple design, it may well be introduced with the instrument.

It is quite expensive to purchase the vernier calipers in large quantities even though a ten per cent discount is offered when they are acquired in lots of six. The aid is quite desirable, however, and the number purchased will be dependent upon the school budget. (Reviewed by Bernard Singer; Hyannis, Massachusetts).

MODELS

M.7—Geometric Models Kit.

Professor M. H. Ahrendt; Anderson College; Anderson, Indiana

Kit; 50¢ each; 3 for $1.00; $4.00 a dozen

Description: This mathematics kit was produced by Science Service as one of their "Things of Science" Service Unit No. 102. It consists of ten items needed to make four geometric models to be used in performing twenty-five simple experiments to discover geometric relations. The articles in the kit include elastic thread, four small cardboard charts, a push pin, screw eye, upholstery nail, two dowels, and a leaflet which describes the experiments to be performed with the models. The experiments all deal with triangles; (1) forming triangles of equal area, (2) relationships of

medians of triangles, (3) lines joining midpoints of the sides of a triangle, (4) relationships of angles and triangles inscribed in a circle. The experiments generally consist in using the elastic thread to find relationships between lines in triangles formed on the cardboard charts.

Appraisal: This kit will give the mathematics teacher material and specific instructions for laboratory work in her geometry classes. Since the models are very small, they should be used by individual students. Thus, to be most effective, every student should be provided with a kit. Another way to utilize the kit would be to use it as a pattern for the students to make their own enlarged version of the kit. Then the students will be able to perform the twenty-five experiments described so that they can visualize many problems and theorems of geometry that often have little meaning when learned from a textbook.

PICTURES

P.4—Galileo

Stanley Bowman Company, 2929 Broadway; New York 24, New York

Picture; 26 by 35″; colored; unmounted $2.50; on panel lacquered, $1\frac{1}{2}$″ ebonized frame $7.00; 3″ natural finish frame $12.00.

Description: This original muragraph is an attractive picture in seven colors. The picture shows Galileo seated at a table with an open book, a quill pen in one hand and the other hand on a globe. A telescope, and astrolabe, and a second globe gives the picture atmosphere related to Galileo's achievements. According to the distributor "careful study and research has made accurate the most minute details" in this picture.

Appraisal: This artistic picture should add atmosphere to the mathematics classroom while at the same time giving colorful decoration. The color and detail of the picture have been artistically executed. However, it would be more appropriate for the mathematics classroom to have pictures of men who are more closely related to the development of mathematics if these were available. In order to display the picture attractively, it is desirable to obtain the mounted picture.

P.5—Portraits of Mathematicians

Pictorial Mathematics, 186th Street and Amsterdam Avenue; New York 33, New York.

Portfolio I; 12 portraits; black and white $5.00; single portrait 50¢.

Portfolio II; 13 portraits; black and white $3.75; single portrait 50¢

Portfolio III; 12 portraits; black and white $3.75; single portrait 50¢.

Portfolio IV; 12 portraits; black and white $3.75; single portrait 50¢.

Description: These portfolios are made up of two-color portraits 10×14 inches in size, suitable for framing, and containing a short biography of the subject.

Portfolio I with biographies by David Eugene Smith, contains pictures of Archimedes, Copernicus, Viete, Galileo, Descartes, Newton, Leibniz, Napier, La Grange, Gauss, Lobachevsky and Sylvester.

Portfolio II with biographies also by Professor Smith, contains pictures of Euclid, Cardan, Kepler, Euler, Fermat, Laplace, Hamilton, Cauchy, Poincaré, Jacobi, Cuyley, Pascal and Chebycheff.

Portfolio III entitled Portraits of Famous Philosophers who were Mathematicians with biographies by Cassius Jackson Keyser, contains pictures of Pythagoras, Plato, Aristotle, Epicurus, Roger Bacon, Descartes, Pascal, Spinoza, Leibniz, Berkeley, Kant and Pierce.

Portfolio IV entitled Portraits of Famous Physicists with biographical sketches by Henry Crew, includes the portraits of Newton, Galileo, Huygens, Ampere, Fresnel, Rowland, Faraday, Joule, Clausius, Hertz, Gibbs and Maxwell.

Appraisal: These portfolios will furnish the mathematics teacher with pictures of leaders of mankind who have left an everlasting impression upon the world's progress. They should be used to illustrate the

historical development of mathematics, for bulletin board displays, or to add atmosphere to the mathematics classroom. They lack the interest of real photographs since they are of necessity all reproductions of ancient portraits. Some of them lack realism while others depict the personality or character in a lifelike fashion.

P.6—Portraits of Mathematicians and Pictures of Mathematical Instruments

Secretary; Smithsonian Institution; Washington 25, D. C.

8×10″; $.40 each.

Description: The Smithsonian Institution prepares and distributes 8″×10″ portraits of the following mathematicians. They should be ordered by negative number and remittance enclosed drawn in favor of the Smithsonian Institution:

Name	*Negative Number*
Descartes	36170-A
Leonhard Euler	13169-A
Galileo	36170
C. F. Gauss	085-E
Pierre Simon de Laplace	9585-H
Gottfried Leibnitz	1389-B
James C. Maxwell	9585-O
Sir Isaac Newton	9585-M

A 5″×7″ portrait of Euclid (9585-G) may be obtained for $.85 and negatives of Thales and Pythagorus may be purchased for $1.25. Prints of the two latter mathematicians are available for $.40. Prints of the three following mathematical instruments are available for the same price:

Persian astrolabe	31010-A
Backstaff	34081
Abacus	19876

Appraisal: The portraits are primarily useful during discussions of the history of mathematics and for purposes of stimulation and atmosphere. The abacus is pertinent not only because of its historical importance but also because of its present significance as a means of speedy computation used in the Orient. The astrolabe and backstaff may well be displayed in the trigonometry and geometry classes where their utility may be proved mathematically. Prices of these photographs are certainly reasonable. (Reviewed by Bernard Singer; Hyannis, Massachusetts).

SOURCES OF MATERIAL FOR LABORATORY WORK

SL.8—World of Wings—Contact! Second Sight

Educational Radio Script Exchange; U. S. Office of Education; Federal Security Agency; Washington, D. C.

Radio Script; 11 pages; mimeographed (15 minutes); Free on loan.

Description: This script is one of many obtainable from the Office of Education, although not many are on subjects useable in mathematics classes. The Chicago Public School of the Air originally produced this drama, for four male voices, which tells the "story of instruments and their necessity in the safe navigation of a plane." By having a veteran pilot tell about instruments and dramatize a war experience when they were necessary, the message is driven home. The pilot names and describes the radio, oil temperature, gauge, altimeter, compass, fuel gauge, climb indicator, air speed indicator, artificial horizons, turn and bank indicator, pressure gauges, techometer, clock, drift indicator, pressure gauge, engine, temperature gauge, directional gyroscope, radio directional finders.

Appraisal: Nothing of immediate interest to mathematics is included; science classes would find more. But mathematicians who do not feel their interest aroused in aviation by this drama as a grand jumping-off place for discussions in geometry and trigonometry are missing one of the best sources of motivation. Classes which try to look up information, write and produce similar dramas for mathematics classes will learn even more. Such dramas can be recorded to become part of the school library of teaching aids.

SL.9—The World is Yours—Romance of Surveying

Educational Radio Script Exchange; U. S. Office of Education; Federal Security Agency; Washington, D. C.

Radio Script; 20 pages, mimeographed (30 minutes); Free on loan.

Description: This script is one written about the "wonders of the Smithsonian Institution." It requires both male and female voices and tells of the exhibit of surveying instruments in the museums. Range finders, transits, bars, compasses, theodolite, dividing engines, telescopes, bench marks, tapes and arometers. A dramatization of the boundary dispute between Maine and New Brunswick in 1839 highlights the importance of surveying in politics. Map and plate making are talked of, and various types of surveying: hydrographic, geodesic, railway, topographical, airplane and cadastral. Other incidents in the use of surveying are dramatized. The degree of accuracy in the instruments is discussed.

Appraisal: No formulas, derivations, manipulation, computation, drawings, or roots of equations, but still good mathematics. Here is the kind of background material which is not found in textbooks and probably none should be. It is information of the best and most authentic kind. It surrounds the formalistic parts with life. Mathematics teachers might even convince the English teachers that producing such a play could be a joint project.

NOTE: A 32 page, mimeographed bibliography listing 260 non-projected aids to teaching may be obtained by sending 35¢ to Henry W. Syer, School of Education, Boston University, Boston, Mass.

Special Citation to Mary A. Potter

Mary A. Potter, active leader and former president of the National Council of Teachers of Mathematics, was awarded a special citation by The University of Wisconsin at a luncheon meeting during the annual Institute for Principals and Superintendents at the University. Miss Potter was one of two teachers in the state of Wisconsin selected for this high honor, which is made even more significant by the fact that this is the first year in which such citations have been awarded. The citation read:

> The University of Wisconsin recognizing the eminent services of Mary A. Potter who through untiring effort as a teacher and leader in Education has won universal respect of adults and the esteem of youth in her community and in the State, presents this Testimonial upon the recommendation of the faculty of the School of Education with the approval of the Regents of the University. In witness thereof it is signed and sealed this 18th day of July 1949.
>
> (Signed) F. J. Sensenbrenner — President of Regents
> (Signed) E. B. Fred — President of University of Wisconsin
> (Signed) John Guy Fowlkes — Dean of School of Education

By happy coincidence the award was made on the first day of the Conference on Teaching Mathematics. The program of the Conference was rearranged so that those attending the Conference could be present at the Citations luncheon. Later at the Conference banquet Miss Potter was presented a corsage as a token of the happiness and honor that her recognition brought to mathematics teachers and in appreciation of her contributions to mathematics education.